



EARTHMASTER

1700, 2200, 2200F, 2500

TILLAGE

Published 04/09

Part NO. 5004WC

OPERATOR'S MANUAL



This Operator's Manual is an integral part of the safe operation of this machine and must be maintained with the unit at all times. READ, UNDERSTAND, and FOLLOW the Safety and Operation Instructions contained in this manual before operating the equipment. C01-Cover

¡ATENCIÓN!

LEA EL INSTRUCTIVO

Si No Lee Ingles, Pida Ayuda a Alguien
Que Si Lo Lea Para Que le Traduzca las
Medidas de Seguridad.



FC-T-0001



M & W[®]

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\$0.00

To the Owner/Operator/Dealer

All implements with moving parts are potentially hazardous. There is no substitute for a cautious, safe-minded operator who recognizes the potential hazards and follows reasonable safety practices. The manufacturer has designed this implement to be used with all its safety equipment properly attached to minimize the chance of accidents.

BEFORE YOU START!! Read the safety messages on the implement and shown in your manual. Observe the rules of safety and common sense!



WARNING

TO AVOID SERIOUS INJURY OR DEATH:

1. READ AND UNDERSTAND OPERATOR'S MANUAL.
2. TRACTOR MUST BE EQUIPPED WITH ROLL-OVER PROTECTION (ROPS) AND SWAY CHAINS.
3. ALWAYS WEAR SAFETY GLASSES, SAFETY SHOES AND SEAT BELT FASTENED TIGHTLY.
4. STOP TRACTOR, LOCK BRAKES, AND BLOCK UP OR SUPPORT IMPLEMENT SECURELY BEFORE WORKING UNDER RAISED COMPONENTS.
5. ALLOW NO RIDERS AT ANY TIME ON TRACTOR OR IMPLEMENT. FALLING OFF CAN KILL.
6. KEEP BYSTANDERS CLEAR OF MOVING PARTS AND WORKING AREA. KEEP CHILDREN AWAY!
7. DO NOT LIFT, LOWER, OR OPERATE UNLESS EVERYONE IS CLEAR OF IMPLEMENT.
8. USE INCREASED CAUTION ON SLOPES & NEAR BANKS AND DITCHES TO PREVENT OVERTURN.
9. LOCK LIFT LEVER UP FOR TRANSPORT. HAVE SMV SIGN VISIBLE. FOLLOW LOCAL LAWS.
10. USE PARKING STAND OR BLOCK UP WHEN UNHITCHING FROM TRACTOR.

999200



WARNING

- Tractor's rearing up may cause machine damage, injury, or death.
- Never use tractor without ROPS.
- Keep seatbelt fastened snugly to prevent falling off and injury. **NO RIDERS.**



- Add tractor front weight as needed to maintain safe steering traction.
- Slow down in curves and rough places.
- Stay away from soft banks and holes.

- Never start or accelerate suddenly to maintain safe steering traction.
- Do not lift heavy implement while going up steep slopes.

999001

WARRANTY INFORMATION:

Read and understand the complete Warranty Statement found in this Manual. Fill out the Warranty Registration Form in full and return it to within 30 Days. Make certain the Serial Number of the Machine is recorded on the Warranty Card and on the Warranty Form that you retain

TABLE OF CONTENTS

SAFETY SECTION 1-1

General Safety Instructions and Practices	1-2
Operator Safety Instructions and Practices	1-3
Equipment Operation Safety Instructions and Practices	1-5
Connecting or Disconnecting Implement Safety Instructions and Practices	1-8
Maintenance and Service Safety Instructions and Practices	1-8
Transporting Safety Instructions and Practices	1-10
Concluding Safety Instructions and Practices	1-12
Decal Location	1-13
Decals	1-15
Federal Laws and Regulations	1-22

INTRODUCTION SECTION 2-1

ASSEMBLY SECTION 3-1

TRACTOR PREPARATION	3-2
INSTALL SPINDLE ASSEMBLIES & TIRES	3-3
REAR MAINFRAME	3-4
Installing V-Ripper Extensions or Wings	3-4
V-RIPPER WING CYLINDER (2457104) 3" X 8"	3-5
Connecting Disc Frame - 1700 & 2200	3-6
Connecting Inner & Outer Disc Folding Assemblies 2200F & 2500	3-7
Disc Wing Cylinder (2467105) 3 1/2" X 10	3-9
FOLDING WING HOSE SCHEMATIC	3-10
RUN FOLDING WING HYDRAULIC HOSES (2200F or 2500)	3-11
COIL TINE HOSE SCHEMATIC	3-12
RUN COIL TINE HYDRAULIC HOSES (2200F or 2500)	3-13
INSTALLING DISC GANGS - 1700	3-14
INSTALLING DISC GANGS - 2200	3-15
INSTALLING DISC GANGS - 2200F	3-16
INSTALLING DISC GANGS - 2500	3-17
DISC GANG PLACEMENT	3-18
DISC GANG INSTALLATION	3-19
INSTALL SHANK MOUNT PLATES AND SHANKS TO V-RIPPER FRAME	3-21
INSTALL SHANKS	3-21
SHANK MOUNT PLATE ALIGNMENT	3-22
COIL TINE LEVELER MOUNT PLATE ALIGNMENT	3-23
COIL TINE LEVERLER	3-24
INSTALLING SHANK MOUNT TUBES	3-25
COIL TINE LEVERLER (1700)	3-26
INSTALLING COIL TINE LEVELER (1700)	3-27
INSTALLING LIGHT KIT UPRIGHTS AND LIGHTS	3-29
INSTALL SMV SIGN MOUNT	3-29
HOSE TIE DOWN	3-30
HOSE SCHEMATIC	3-31
DEALER ASSEMBLY PREPARATION CHECKLIST FOR THE EARTH MASTER	33-33

OPERATION SECTION 4-1

Standard Equipment and Specifications	4-3
OPERATOR REQUIREMENTS	4-4

TRACTOR REQUIREMENTS	4-5
ROPS and Seat Belt	4-5
Tractor Safety Devices	4-5
Tractor Horsepower	4-6
Front End Weight	4-6
Tractor Hydraulics	4-6
GETTING ON AND OFF THE TRACTOR	4-6
Boarding the Tractor	4-6
Dismounting the Tractor	4-7
STARTING THE TRACTOR	4-8
CONNECTING THE IMPLEMENT TO THE TRACTOR	4-8
Connecting the Implement	4-9
SETTING THE IMPLEMENT	4-10
Setting the Tillage Equipment	4-10
PRE-OPERATION INSPECTION AND SERVICE	4-14
Tractor Pre-Operation Inspection/Service	4-15
Implement Pre-Operation Inspection/Service	4-15
DRIVING THE TRACTOR AND IMPLEMENT	4-19
Starting the Tractor	4-20
Brake and Differential Lock Setting	4-20
Raising the Unit	4-20
Driving the Tractor and Implement	4-21
OPERATING THE TRACTOR AND IMPLEMENT	4-21
Foreign Debris Hazards	4-22
Operating the Implement	4-23
Operating the Implement	4-23
DISCONNECTING THE IMPLEMENT FROM THE TRACTOR	4-24
IMPLEMENT STORAGE	4-25
TRANSPORTING THE TRACTOR AND IMPLEMENT	4-25
Transporting on Public Roadways	4-26
Hauling the Tractor and Implement	4-28
MAINTENANCE SECTION	5-1
GENERAL MAINTENANCE	5-2
PROPER TORQUE CHART FOR FASTENERS	5-2

SAFETY SECTION

SAFETY

SAFETY

General Safety Instructions and Practices

A careful operator is the best operator. Safety is of primary importance to the manufacturer and should be to the owner/operator. Most accidents can be avoided by being aware of your equipment, your surroundings, and observing certain precautions. The first section of this manual includes a list of Safety Messages that, if followed, will help protect the operator and bystanders from injury or death. Read and understand these Safety Messages before assembling, operating or servicing this Implement. This equipment should only be operated by those persons who have read the manual, who are responsible and trained, and who know how to do so responsibly.



The Safety Alert Symbol combined with a Signal Word, as seen below, is used throughout this manual and on decals which are attached to the equipment. The Safety Alert Symbol means: "ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!" The Symbol and Signal Word are intended to warn the owner/operator of impending hazards and the degree of possible injury faced when operating this equipment.

Practice all usual and customary safe working precautions and above all---remember safety is up to YOU. Only YOU can prevent serious injury or death from unsafe practices.



Indicates an imminently hazardous situation that, if not avoided, WILL result in DEATH OR VERY SERIOUS INJURY.



Indicates an imminently hazardous situation that, if not avoided, COULD result in DEATH OR SERIOUS INJURY.



Indicates an imminently hazardous situation that, if not avoided, MAY result in MINOR INJURY.

Important

Identifies special instructions or procedures that, if not strictly observed, could result in damage to, or destruction of the machine, attachments or the environment.

NOTE: *Identifies points of particular interest for more efficient and convenient operation or repair.* (SG-1)

READ, UNDERSTAND, and FOLLOW the following Safety Messages. Serious injury or death may occur unless care is taken to follow the warnings and instructions stated in the Safety Messages. Always use good common sense to avoid hazards. (SG-2)



Si no lee ingles, pida ayuda a alguien que si lo lea para que le traduzca las medidas de seguridad. (SG-3)

¡ LEA EL INSTRUCTIVO!



SAFETY



WARNING

Engine Exhaust, some of its constituents, and certain vehicle components contain or emit chemicals known to the state of California to cause cancer and birth defects or other reproductive harm. (SG-30)



WARNING

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer, birth defects or other reproductive harm. (SG-31)



DANGER

There are obvious and hidden potential hazards in the operation of this Implement as in all power-driven or pulled equipment. REMEMBER! This machine is often operated in rough terrain conditions that include grass, weeds, gullies, holes, slopes, hidden obstructions and the like. Serious injury or even death may occur unless care is taken to assure the safety of the operator and bystanders in the area. Do not operate this machine with anyone in the immediate area. Stop operating if anyone comes within 25 feet of the equipment. (STL-4)

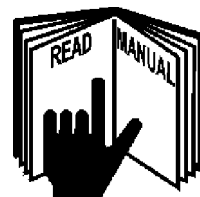
SAFETY

Operator Safety Instructions and Practices



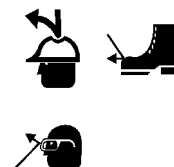
DANGER

Never operate the Tractor or Implement until you have read and completely understand this Manual, the Tractor Operator's Manual, and each of the Safety Messages found in the Manual or on the Tractor and Implement. Learn how to stop the tractor engine suddenly in an emergency. Never allow inexperienced or untrained personnel to operate the Tractor and Implement without supervision. Make sure the operator has fully read and understood the manuals prior to operation. (SG-4)



WARNING

The operator and all support personnel should wear hard hats, safety shoes, safety glasses, and proper hearing protection at all times for protection from injury including injury from items that may be thrown by the equipment. (SG-16)



CAUTION

PROLONGED EXPOSURE TO LOUD NOISE MAY CAUSE PERMANENT HEARING LOSS! Tractors with or without an Implement attached can often be noisy enough to cause permanent hearing loss. We recommend that you always wear hearing protection if the noise in the Operator's position exceeds 80db. Noise over 85db over an extended period of time will cause severe hearing loss. Noise over 90db adjacent to the Operator over an extended period of time will cause permanent or total hearing loss. **NOTE:** *Hearing loss from loud noise [from tractors, chain saws, radios, and other such sources close to the ear] is cumulative over a lifetime without hope of natural recovery.* (SG-17)



SAFETY

SAFETY



WARNING

Always read carefully and comply fully with the manufacturer's instructions when handling oil, solvents, cleansers, and any other chemical agent. (SG-22)



DANGER

KEEP AWAY FROM ROTATING ELEMENTS to prevent entanglement and possible serious injury or death. (SG-24)



DANGER

Never allow children to play on or around Tractor or Implement. Children can slip or fall off the Equipment and be injured or killed. Children can cause the Implement to shift or fall crushing themselves or others. (SG-25)



DANGER

NEVER use drugs or alcohol immediately before or while operating the Tractor and Implement. Drugs and alcohol will affect an operator's alertness and coordination and therefore affect the operator's ability to operate the equipment safely. Before operating the Tractor or Implement, an operator on prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to operate the Equipment safely. NEVER knowingly allow anyone to operate this equipment when their alertness or coordination is impaired. Serious injury or death to the operator or others could result if the operator is under the influence of drugs or alcohol. (SG-27)



WARNING

Prolonged operation may cause operator boredom and fatigue affecting safe operation. Take scheduled work breaks to help prevent these potentially impaired operating conditions. Never operate the Implement and Tractor in a fatigued or bored mental state which impairs proper and safe operation. (SG-32)



WARNING

Use extreme caution when getting onto the Implement to perform repairs, maintenance and when removing accumulated material. Only stand on solid flat surfaces to ensure good footing. Use a ladder or raised stand to access high spots which cannot be reached from ground level. Slipping and falling can cause serious injury or death. (SG-33)



WARNING

Avoid contact with hot surfaces including hydraulic oil tanks, pumps, motors, valves and hose connections. Relieve hydraulic pressure before performing maintenance or repairs. Use gloves and eye protection when servicing hot components. Contact with a hot surface or fluid can cause serious injury from burns or scalding. (SG-34)

SAFETY



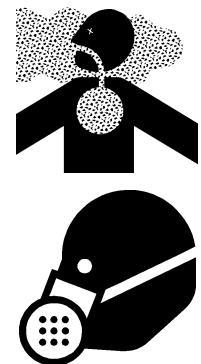
DO NOT operate this Implement on a Tractor that is not properly maintained. Should a mechanical or Tractor control failure occur while operating, immediately shut down the Tractor and perform repairs before resuming operation. Serious injury and possible death could occur from not maintaining this Implement and Tractor in good operating condition. (SG-36)



Avoid contact with hot surfaces of the engine or muffler. Use gloves and eye protection when servicing hot components. Contact with a hot surface or fluid can cause serious injury from burns or scalding. (SG-38)



Repeated or substantial breathing of hazardous dusts, including crystalline silica, could cause fatal or serious respiratory disease including silicosis. Concrete, masonry, many types of rock, and various other materials contain silica sand. California lists respirable crystalline silica as a substance known to cause cancer. Operation of this equipment under certain conditions may generate airborne dust particles that could contain crystalline silica. In those conditions, personal protective equipment including an appropriate respirator must be used. If excessive dust is generated, a dust collection or suppression system should also be used during operation. (SG-41)



Be sure you have adequate knowledge of the property you will be working on. Take time to make yourself aware of any area underground lines or cables. Contact with buried lines or cable could result in **serious injury or death**. (STL-1)



In wet conditions where there is a likelihood of material collecting on the Implement, make certain that this material is removed before traveling on public roadways. (STL-7)



Keep fingers clear of tongue lock pin holes. A sudden movement could cause injury or even amputate fingers. **KEEP CHILDREN AWAY WHEN CHANGING TONGUE POSITION.** (STL-18)

Equipment Operation Safety Instructions and Practices



Operate this Implement only in conditions where you have clear visibility in daylight or with adequate artificial lighting. Never operate in darkness or foggy conditions where you cannot clearly see at least 100 yards in front and to the sides of the tractor and implement. Make sure that you can clearly see and identify passersby, steep slopes, ditches, drop-offs, overhead obstructions, power lines, debris and foreign objects. If you are unable to clearly see this type of items discontinue operating this equipment. (S3PT-21)

SAFETY

SAFETY

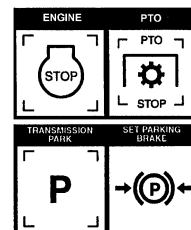
WARNING

Operate this Equipment only with a Tractor equipped with an approved roll-over-protective system (ROPS). Always wear seat belts. Serious injury or even death could result from falling off the tractor--particularly during a turnover when the operator could be pinned under the ROPS. (SG-7)



DANGER

BEFORE leaving the tractor seat, always engage the brake and/or set the tractor transmission in parking gear, disengage the PTO, stop the engine, remove the key, and wait for all moving parts to stop. Place the tractor shift lever into a low range or parking gear to prevent the tractor from rolling. Never dismount a Tractor that is moving or while the engine is running. Operate the Tractor controls from the tractor seat only. (SG-9)



DANGER

Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in serious injury or death. (SG-10)



DANGER

Never allow children to operate, ride on, or come close to the Tractor or Implement. Usually, 16-17 year-old children who are mature and responsible can operate the implement with adult supervision, if they have read and understand the Operator's Manuals, been trained in proper operation of the tractor and Implement, and are physically large enough to reach and operate the controls easily. (SG-11)



WARNING

Do not mount or dismount the Tractor while the tractor is moving. Mount the Tractor only when the Tractor and all moving parts are completely stopped. (SG-12)



DANGER

Start tractor only when properly seated in the Tractor seat. Starting a tractor in gear can result in injury or death. Read the Tractor operators manual for proper starting instructions. (SG-13)



SAFETY

WARNING

Do not operate this Equipment with hydraulic oil or fuel leaking. Oil and fuel are explosive and their presence could present a hazard. Do not check for leaks with your hand! High-pressure oil streams from breaks in the line could penetrate the skin and cause tissue damage including gangrene. To check for a hose leak, SHUT the unit ENGINE OFF and remove all hydraulic pressure. Wear oil impenetrable gloves, safety glasses and use Cardboard to check for evidence of oil leaks. If you suspect a leak, REMOVE the HOSE and have it tested at a Dealer. If oil does penetrate the skin, have the injury treated immediately by a physician knowledgeable and skilled in this procedure. (SG-15)



DANGER

Never run the Tractor engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health. (SG-23)

DANGER

Operate the Tractor and/or Implement controls only while properly seated in the Tractor seat with the seat belt securely fastened around you. Inadvertent movement of the Tractor or Implement may cause serious injury or death. (SG-29)

WARNING

In case of mechanical difficulty during operation, place the transmission in the park position, set the parking brake, shut down all power, including the PTO and the engine and remove the key. Wait until all rotating motion has stopped before dismounting. (SG-39)

WARNING

Do Not operate this equipment in areas where insects such as bees may attack you and/or cause you to lose control of the equipment. If you must enter in such areas, use a tractor with an enclosed Cab and close the windows to prevent insects from entering. If a tractor cab is not available, wear suitable clothing including head, face, and hand protection to shield you from the insects. Attacking insects can cause you to lose control of the tractor, which can result in serious injury or death to you or bystanders. Never dismount a moving tractor. (SG-40)

DANGER

DO NOT allow any person under a folded wing unless wing is securely locked up or supported. **DO NOT** approach the Implement unless the Tractor is turned off and all motion has ceased. Never work under the frame work, or any lifted component unless the implement is securely supported or blocked up. A sudden or inadvertent fall by any of these components could cause serious injury or even death. (STI-03)



SAFETY

SAFETY



WARNING Extreme care should be taken when operating near loose objects such as gravel, rocks, wire, and other debris. Inspect the area before tilling. Foreign objects should be removed from the site to prevent machine damage and/or bodily injury or even death. Any objects that cannot be removed must be clearly marked and carefully avoided by the operator. Stop operating immediately if blades strike a foreign object. Repair all damage and make certain rotor and blades are in good condition before resuming operation. (STL-5)



WARNING Many varied objects, such as wire, cable, rope, or chains, can become entangled in the rotating parts of the Implement. These objects could then swing outside the housing at greater velocities than the blades. Such a situation is extremely hazardous and could result in serious injury or even death. Inspect the area for such objects before working in the area. Remove any such objects from the site. Never allow the implement to contact such objects. (STL-6)



WARNING Do not operate the Implement when bystanders or animals are near (within 50 feet) the equipment. This Implement is capable of throwing objects for significant distances and causing serious injury. Stop the Tractor and Implement immediately if a bystander or animal comes near the equipment. (STL-13)

Connecting or Disconnecting Implement Safety Instructions and Practices



WARNING Never unhitch without using the Tongue Jack. The Tongue is very heavy. Attempting to lift the Tongue without using the Tongue Jack could cause strains or other injury. Allowing the tongue to fall suddenly and unexpectedly could result in crushing injury. Use the Tongue Jack for lifting the Implement only. Overloading the Tongue Jack can cause failure with possible serious bodily injury or even death. (STI-04)

Maintenance and Service Safety Instructions and Practices



DANGER Always disconnect the main PTO Driveline from the Tractor before performing service on the Implement. Never work on the Implement with the tractor PTO driveline connected and running. Rotating Parts, Blades or Drivelines could turn without warning and cause immediate entanglement, injury or death. (S3PT-11)



WARNING Always maintain the safety signs in good readable condition. If the safety signs are missing, damaged, or unreadable, obtain and install replacement safety signs immediately. (SG-5)



WARNING Do not modify or alter this Implement. Do not permit anyone to modify or alter this Implement, any of its components or any Implement function. (SG-8)

SAFETY

⚠ DANGER

Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported or blocked up to prevent sudden or inadvertent falling which could cause serious injury or even death. (SG-14)

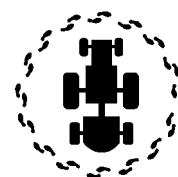


⚠ WARNING

Never attempt to lubricate, adjust, or remove material from the Implement while it is in motion or while tractor engine is running. (SG-20)

⚠ WARNING

Periodically inspect all moving parts for wear and replace when necessary with authorized service parts. Look for loose fasteners, worn or broken parts, and leaky or loose fittings. Make sure all pins have cotter pins and washers. Serious injury may occur from not maintaining this machine in good working order. (SG-21)



⚠ WARNING

Perform service, repairs and lubrication according to the maintenance section. Ensure the unit is properly lubricated as specified in the lubrication schedule and all bolts and nuts are properly torqued. Failure to properly service, repair and maintain this Implement in good operating condition could cause component failure and possible serious injury or even death. (SG-35)

⚠ WARNING

Use caution and wear protective gloves when handling sharp objects such as blades, knives, and other cutting edges. Be alert to worn component surfaces which have sharp edges. Sharp surfaces can inflict severe laceration injuries if proper hand protection is not worn. (SG-37)

PARTS INFORMATION

M&W implements use matched system components for blades, hangers, rollers, and bearings. These parts are made and tested to M&W specifications. Non-genuine "will fit" parts do not consistently meet these specifications. The use of "will fit" parts may reduce the implements performance, void warranties, and present a safety hazard. Use genuine M&W parts for economy and safety. (SPMW-1)

SEE YOUR M&W DEALER

⚠ WARNING

Ensure any remote starting system is inoperative before servicing or cleaning the machine. Inadvertent engine start up could result in entanglement or runover causing serious injuries or death. (SSB-17)

SAFETY

SAFETY

SAFETY



Use extreme care when climbing onto the Equipment to perform repairs, maintenance, and cleaning. Use proper stands and ladders to access areas that cannot be reached from ground level. Slipping and falling off the Equipment can cause serious injury or death. (SSB-25)



Exercise care when handling the discs. Disc blades are SHARP and HEAVY. Wear gloves at all time to protect your hands. (STL-10)



Do not use your hands or feet to clean the disc gangs. The discs are sharp and serious injuries could result from inadvertent contact with the discs. Never attempt to stand on the discs, tires, or frame members of the implement. (STL-11)



Relieve hydraulic pressure prior to doing any maintenance or repair work on the Implement. Place the Implement on the ground or securely blocked up, disengage the PTO, and turn off the tractor engine. Push and pull the Remote Cylinder lever in and out several times. Disconnect and remove the Implement hydraulic hoses from the tractor prior to starting any maintenance or repair work. (STL-17)

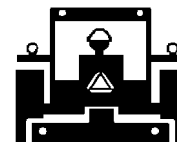


Never attempt to remove a jam or service the implement until the Implement Hydraulic Hoses have been DISCONNECTED AND REMOVED from the tractor. Serious body injury or death can result from entanglement with the rotating components of the conveyer. (STL-25)

Transporting Safety Instructions and Practices



Make certain that the "Slow Moving Vehicle" (SMV) sign is installed in such a way as to be clearly visible and legible. When transporting the Equipment use the Tractor flashing warning lights and follow all local traffic regulations. (SG-6)



SAFETY

⚠ WARNING

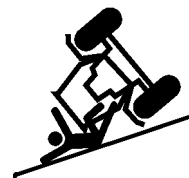
Transport only at speeds where you can maintain control of the equipment. Serious accidents and injuries can result from operating this equipment at high speeds. Understand the Tractor and Implement and how it handles before transporting on streets and highways. Make sure the Tractor steering and brakes are in good condition and operate properly.



Before transporting the Tractor and Implement, determine the proper transport speeds for you and the equipment. Make sure you abide by the following rules:

Test the tractor at a slow speed and increase the speed slowly. Apply the Brakes smoothly to determine the stopping characteristics of the Tractor and Implement. As you increase the speed of the Tractor the stopping distance increases. Determine the maximum transport speed not to exceed 20 mph (30 kph) for transporting this equipment.

Test the equipment at a slow speed in turns. Increase the speed through the turn only after you determine that the equipment can be operated at a higher speed. Use extreme care and reduce your speed when turning sharply to prevent the tractor and implement from turning over. Determine the maximum turning speed for you and this equipment before operating on roads or uneven ground.



Only transport the Tractor and Implement at the speeds which allow you to properly control the equipment.

Be aware of the operating conditions. Do not operate the Tractor with weak or faulty brakes or worn tires. When operating down a hill or on wet or rain slick roads, the braking distance increases: use extreme care and reduce your speed. When operating in traffic always use the Tractor's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy. (SG-19)

⚠ DANGER

Be particularly careful when transporting the Implement using the tractor. Turn curves or go up or down hills only at a low speed and at a gradual steering angle. Make certain that at least 20% of the tractor's weight is on the front wheels to maintain safe steering. Slow down on rough or uneven surfaces. (STI-01)

⚠ WARNING

Only tow the Implement behind a properly sized and equipped Tractor which exceeds the weight of the Implement by at least 20%. DO NOT tow the Implement behind a truck or other type of vehicle. Never tow the Implement and another Implement connected in tandem. Never tow the Implement at speeds over 20 MPH. (STI-06)



⚠ WARNING

Secure the Implement for transport before traveling on public roads. For pull-type Implements, secure the center axle using cylinder stops or transport pin and properly attach a safety chain between the Implement and Tractor. Secure wings in upright position on folding Implements using wing transport locks. (STI-7)

SAFETY



Always keep a careful lookout and use extreme care when working around overhead obstructions and electrical power lines. The Implement wing can be over 10 feet high. Never allow the Implement wing to come within 10 feet of any power line. (STI-8)



Your driving vision may be reduced or impaired by the tractor, cab, or implement. Before driving on public roadways identify any limited vision areas, and make adjustments to your operating position, mirrors, and the implement transport position so that you can clearly see the area where you will be traveling, and any traffic that may approach you. Failure to maintain adequate vision of the public roadway and traffic can result in serious injury or even death. (STI-10)



Lock the disc gangs in the raised position before transporting the Implement. Serious Implement and/or road damage could result from unintentional dropping of the discs gangs. Be sure to pin the tractor drawbar rigid in the center position and properly attach the Implement safety tow chain. (STL-9)

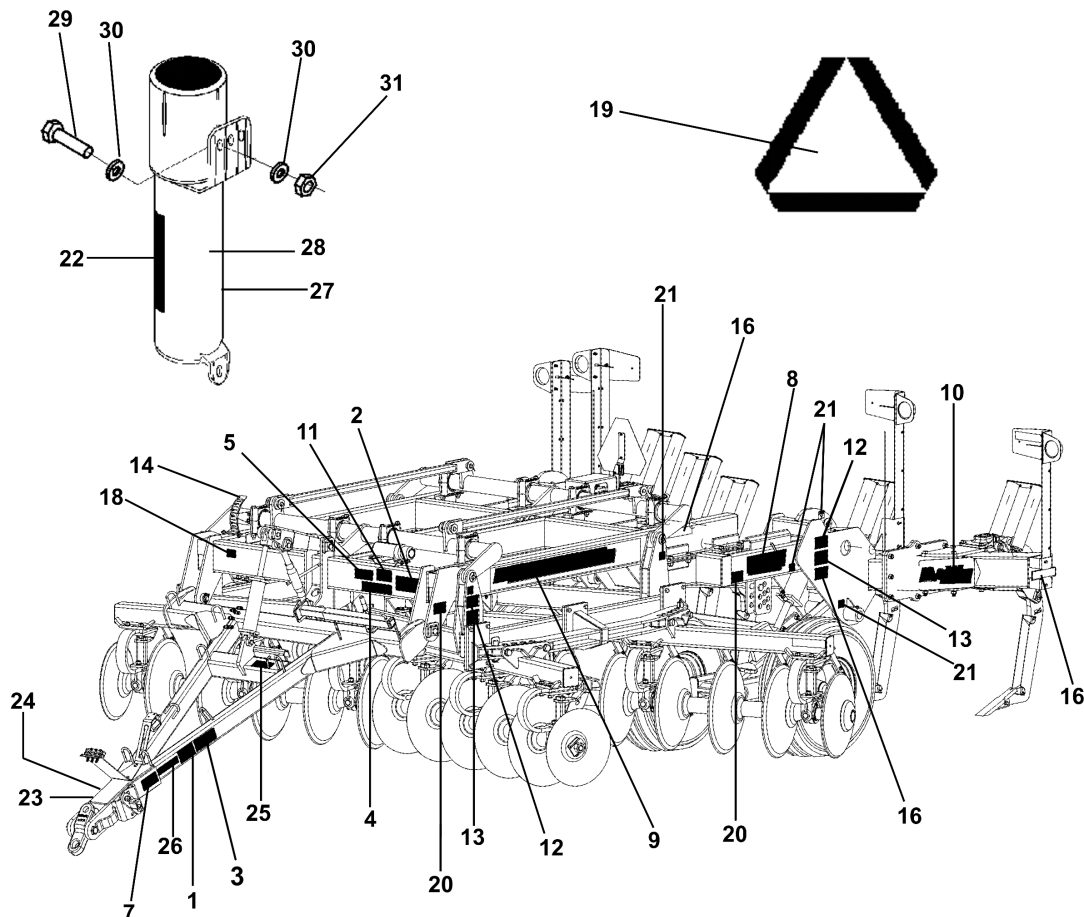
Concluding Safety Instructions and Practices

In addition to the design and configuration of this Implement, including Safety Signs and Safety Equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of personnel involved in the operation, transport, maintenance, and storage of the machine. Refer also to Safety Messages and operation instruction in each of the appropriate sections of the Tractor and Equipment Manuals. Pay close attention to the Safety Signs affixed to the Tractor and Equipment. (SG-18)

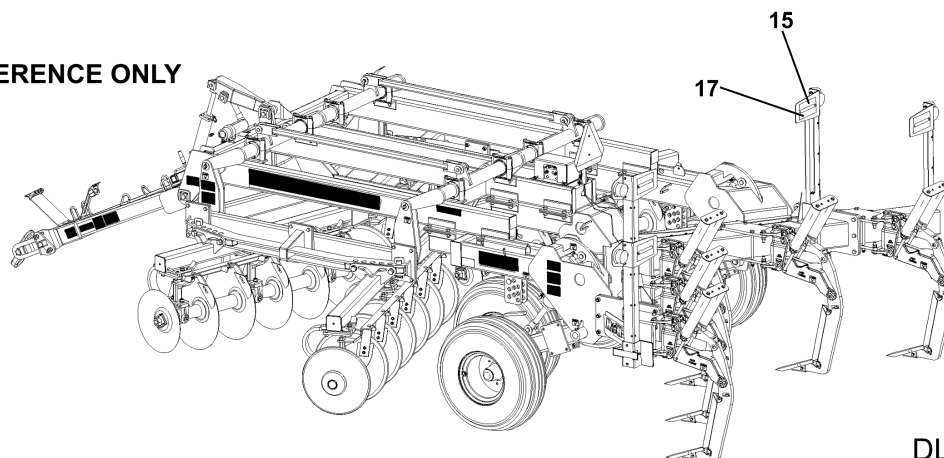
SAFETY

SAFETY

Decal Location



REFERENCE ONLY



DL-T-0008

Note: M & W supplies safety decals on this product to promote safe operation. Damage to the decals may occur while in shipping, use or reconditioning. M & W cares about the safety of its customers, operators, and bystanders, and will replace the safety decals on this product in the field, free of charge (Some shipping and handling charges may apply). Contact M & W dealer to order replacement decals.

SAFETY

SAFETY

ITEM	PART NO.	QTY	TYPE	DESCRIPTION
1.	D102	1	INSTRUCT	Drawbar Length
2.	999200	1	WARNING	General Warning
3.	999001	1	WARNING	General Tractor Steering
4.	5W119	1	WARNING	Speed Restriction
5.	3668308	1	WARNING	Transport
6.	2468317	1	INFO	Ripper Depth Setting
7.	2468316	1	ATTENTION	Jack Mount
8.	2468313	2	NAME	Model 1700
	2468319	1	NAME	Model 2200F
	2468314	1	NAME	Model 2200
	2468315	1	NAME	Model 2500
9.	2468312	2	LOGO	M & W Earthmaster
10.	2468311	2	LOGO	M & W
11.	2468310	1	INSTRUCT	Lubrication Chart
12.	2468309	3	WARNING	Possible Crushing (Not Shown in Description)
13.	2468308	3	INSTRUCT	Maintenance
14.	2468304	1	INFO	Disc Depth Gauge (Not Shown in Description)
15.	1458398	4	REFLCTR	Orange Reflector
16.	1458393	8	REFLCTR	Yellow Reflector
17.	1458392	4	REFLCTR	Red Reflector
18.	1458380	1	INFO	Made in USA
19.	03200347	*	REFLECT	SMV Sign
20.	02962765	1	DANGER	Crushing and Pinch Points
21.	02962764	20	WARNING	Pinch Points
22.				
23.	00771039	1	IMPORTANT	Use M & W Genuine Parts
24.	00763977	1	IMPORTANT	Notice to Owner
25.	00756059	1	WARNING	Oil Leak
26.	00725746	1	PELIGRO	Spanish - Get Translation
27.	00776031	1		Canister, Operator's Manual
28.	5004WC	1		Operator's Manual
29.	10058000	3		Bolt
30.	00024100	3		Flatwasher
31.	02959924	3		Locknut

SAFETY

Decals

IMPORTANT! Required For Jackshaft Unit.
Suggested for standard shaft.

P/N D102

WARNING! Speed Restriction.

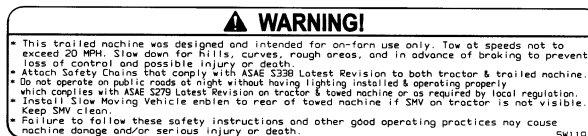
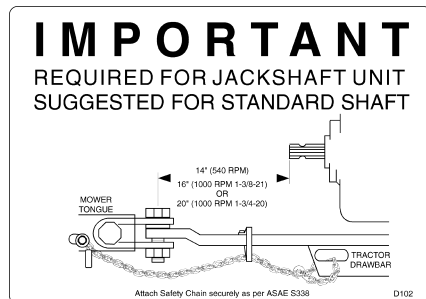
P/N 5W119

WARNING! Tractor rearing

P/N 999001

WARNING!- Multiple Hazard and General Safety

P/N 999200



SAFETY

SAFETY

WARNING! Transport.

P/N 3668308

INFORMATION - Ripper Depth Setting.

P/N 2468317

ATTENTION - Jack Mount.

P/N 2468316

NAME - Model 1700.

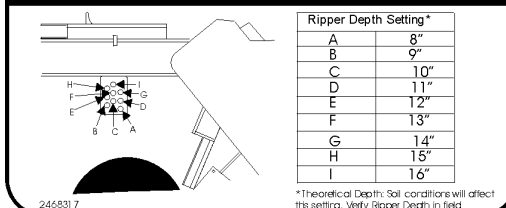
P/N 2468313

WARNING

- * Never transport equipment without correctly installing transport lock. See operators manual for correct installation.
- * Failure to properly install transport lock arms could result in equipment damage, serious injury or death.

3668308

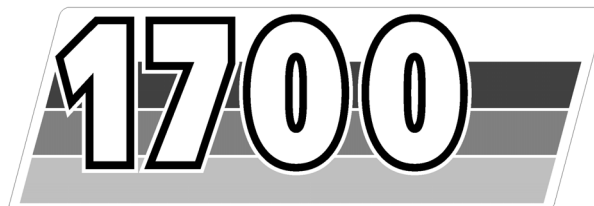
RIPPER DEPTH SETTING



ATTENTION

1. To keep tractor tire from damaging jack when turning, remove jack from outside of tongue and install it on the jack mount located on the top rear of tongue.
2. Adjust jack mount bolts on side of tongue so that jack is level when installed.

2468316



SAFETY

NAME - Model 2200.

P/N 2468314

NAME - Model 2200F.

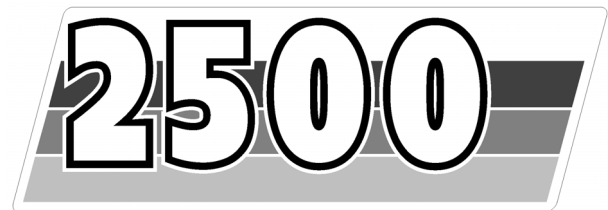
P/N 2468319

NAME - Model 2500.

P/N 2468315

LOGO - M & W Earthmaster.

P/N 2468312



SAFETY

SAFETY

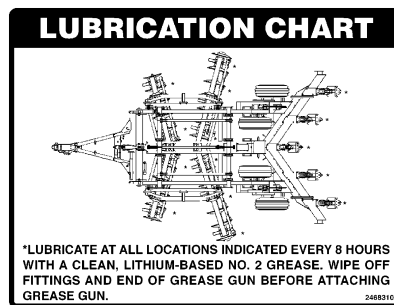
SAFETY

LOGO - M & W



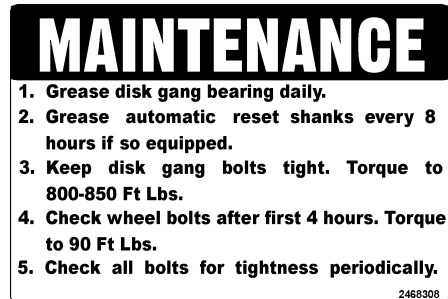
P/N 2468311

INSTRUCTION - Lubrication Chart.



P/N 2468310

INSTRUCTION - Maintenance.



P/N 2468308

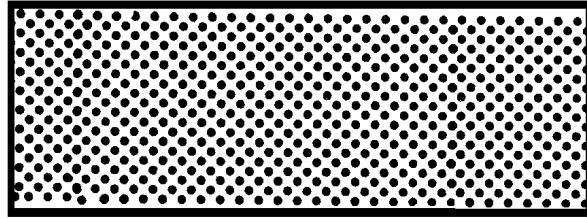
INSTRUCTION - Disc Depth Gauge.



P/N 2468304

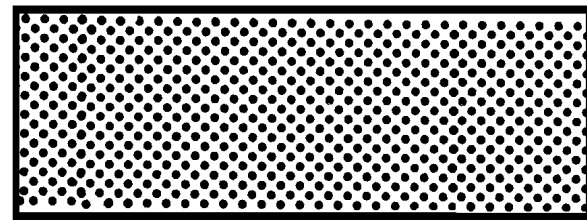
SAFETY

Orange Reflector. Keep reflectors clean and visible.



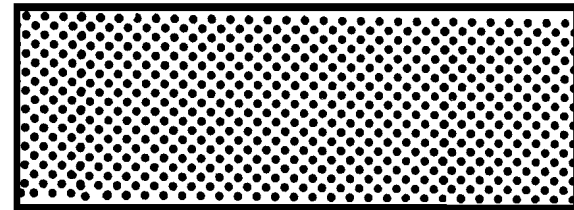
P/N 1458398

Amber Reflector. Keep reflectors clean and visible.



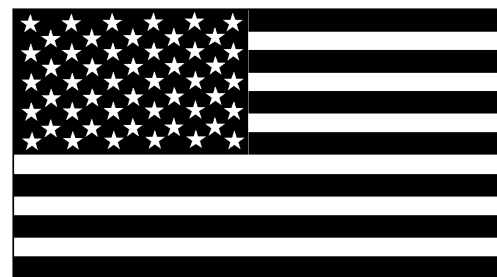
P/N 1458393

Red Reflector. Keep reflectors clean and visible.



P/N 1458392

Made in USA



MADE IN USA

1458380

SAFETY

SAFETY

SAFETY

Slow Moving Vehicle Decal. Keep SMV reflector clean and visible. DO NOT transport or operate without the SMV.

P/N 03200347

DANGER! Crushing and Pinch Points.
Moving machiney parts can pinch or crush or fall-which may cause injury or death.

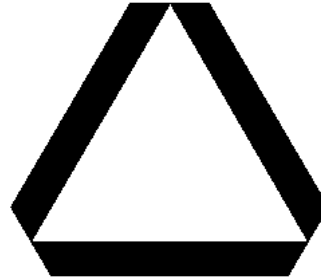
P/N 02962765

WARNING! Pinch Points

P/N 02962764

IMPORTANT - Use Genuine M&W Replacement Parts.

00771039



SAFETY

Operator's Manual (with repair parts) and warranty was attached to this implement during final inspection.

P/N 00763977

WARNING! Never use your hand to check for oil leaks. Always use paper or cardboard.

P/N 00756059

Peligro Translation, If you do not know how to read English, please find someone who knows how to read English.

P/N 00725746

Read Operator's Manual! The operator's manual is located inside this canister. If the manual is missing order one from your dealer.

P/N 00776031

NOTICE TO OWNER

An **OPERATOR'S MANUAL** (with Repair Parts Listing) and a **WARRANTY REGISTRATION CARD** were attached to this implement during final inspection at the factory. If they were not attached at the time of purchase, please contact your selling dealer at once.

1. Read and understand the Operator's Manual before operating the implement.
2. Complete, sign, and mail the Warranty Registration Card today.

00763977

WARNING

USE PAPER OR CARDBOARD TO CHECK FOR LEAKS. **NEVER USE YOUR HAND.** IF OIL PENETRATES SKIN, GANGRENE OR OTHER SERIOUS INJURY COULD OCCUR. **GET IMMEDIATE MEDICAL ATTENTION.** See Operator's Manual.



00756059

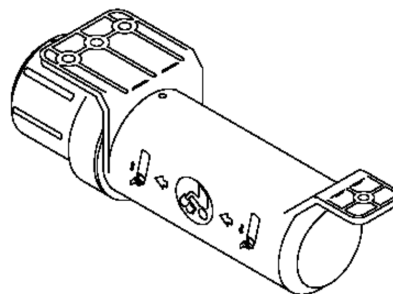
PELIGRO

LEA EL INSTRUCTIVO

Si No Lee Ingles, Pida Ayuda a Alguien Que Si Lo Lea Para Que le Traduzca las Medidas de Seguridad.



00725746



SAFETY

SAFETY

Federal Laws and Regulations

This section is intended to explain in broad terms the concept and effect of federal laws and regulations concerning employer and employee equipment operators. This section is not intended as a legal interpretation of the law and should not be considered as such.

Employer-Employee Operator Regulations

U.S. Public Law 91-596 (The Williams-Steiger Occupational and Health Act of 1970) OSHA

This Act Seeks:

“...to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources...”

DUTIES

Sec. 5 (a) Each employer-

- (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
- (2) shall comply with occupational safety and health standards promulgated under this Act.
- (b) Each employee shall comply with occupational safety and health standards and all rules, regulations and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA Regulations

OSHA regulations state in part: “At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all equipment with which the employee is, or will be involved.”

Employer Responsibilities:

To ensure employee safety during Tractor and Implement operation, it is the employer's responsibility to:

1. Train the employee in the proper and safe operation of the Tractor and Implement.
2. Require that the employee read and fully understand the Tractor and Implement Operator's manual.
3. Permit only qualified and properly trained employees to operate the Tractor and Implement.
4. Maintain the Tractor and Implement in a safe operational condition and maintain all shields and guards on the equipment.
5. Ensure the Tractor is equipped with a functional ROPS and seat belt and require that the employee operator securely fasten the safety belt and operate with the ROPS in the raised position at all times.
6. Forbid the employee operator to carry additional riders on the Tractor or Implement.
7. Provide the required tools to maintain the Tractor and Implement in a good safe working condition and provide the necessary support devices to secure the equipment safely while performing repairs and service.
8. Require that the employee operator stop operation if bystanders or passersby come within 25 feet.

Child Labor Under 16 Years of Age

Some regulations specify that no one under the age of 16 may operate power machinery. It is your responsibility to know what these regulations are in your own area or situation. (Refer to U.S. Dept. of Labor, Employment Standard Administration, Wage & Home Division, Child Labor Bulletin #102.)

INTRODUCTION SECTION

Introduction Section 2-1

INTRODUCTION

INTRODUCTION

These tillage implements are designed with care and built with quality materials by skilled workers. Proper assembly, maintenance, and operating practices, as described in this manual, will help the owner/operator get years of satisfactory service from the machine.

The purpose of this manual is to familiarize, instruct, and train. The Assembly Section instructs the owner/operator in the correct assembly of the Mower using standard and optional equipment. The Parts Listing section is designed to familiarize the owner/operator with replaceable parts on the Implement. This section provides exploded assembly drawings of each implement component illustrating each piece and the corresponding part number.

Careful use and timely service save extensive repairs and costly downtime losses. The Operation and Maintenance Sections of the manual train the owner/operator how to work the Implement correctly and attend to appropriate maintenance. The Trouble Shooting Guide helps diagnose difficulties with implement and offers solution to the problems.

Safety is of primary importance to the owner/operator and to the manufacturer. The first section of this manual includes a list of Safety Messages, that, if followed, will help protect the operator and bystanders from injury or death. Many of the Safety Messages will be repeated throughout the manual. The owner/operator/dealer should know these Safety Messages before assembly and be aware of the hazards of operating this implement during assembly, use, and maintenance. The Safety Alert Symbol combined with a Signal Word, as seen below, is intended to warn the owner/operator of impending hazards and the degree of possible injury faced when operating this machine.



Indicates an imminently hazardous situation that, if not avoided, WILL result in DEATH OR VERY SERIOUS INJURY.



Indicates an imminently hazardous situation that, if not avoided, COULD result in DEATH OR SERIOUS INJURY.



Indicates an imminently hazardous situation that, if not avoided, MAY result in MINOR INJURY.



Identifies special instructions or procedures that, if not strictly observed, could result in damage to, or destruction of the machine, attachments or the environment.

INTRODUCTION



INTRODUCTION

The new Earthmaster is designed with two tillage tools, a tandem disc and a V-chisel connected together as one unit for one pass operation in standing corn stalks, bean stubble, and other crop residues.

The V-Chisel bar design places the chisel shanks offsets behind each other to allow crop residue to flow between and around them. The 36" tall chisel shanks will penetrate the soil up to 16" deep to get under the hard plow sole-lifting, shattering and breaking it up with the least amount of power required. This allows the surface water to penetrate deeper into the soil, but most of all, it allows your crop roots to penetrate deeper into the soil to use the valuable moisture and fertilizer all season long and even during a dry season.

It is extremely important that the Earthmaster operates level (disc and chisel) at all times. This will minimize the horsepower requirements and allow the best flow of soil and residue through the machine.

In cornstalks and other rowed crops, operate at a slight angle to the row. This allows better trash flow and assures the shanks will not constantly operate on a row or between rows.

An optional Coil Tine Leveler is available for leaving a smooth field behind for later planting.

INTRODUCTION

INTRODUCTION

Attention Owner/Operator

BEFORE OPERATING THIS MACHINE:

1. Carefully read the Operator's Manual, completely understand the Safety Messages and instructions, and know how to operate correctly both the tractor and implement.
2. Fill out the Warranty Card in full. Be sure to answer all questions, including the Serial Number of the Mower. Mail within 30 days of delivery date of this implement.

NOTE: Warranties are honored only if completed "Owner Registration and Warranty" forms are received by Alamo Group within thirty days of delivery of the implement.

3. Record the Mower Model and Serial Numbers on the Warranty page at the front of the Operator's Manual. Keep this as part of the permanent maintenance file for the implement.



IMPORTANT

For your safety and to guarantee optimum product reliability, always use genuine M&W replacement parts. The use of inferior "will-fit" parts will void warranty of your M&W implement and may cause premature or catastrophic failure which can result in serious injury or death. If you have any questions concerning the repair parts you are using, contact M&W, 1020 South Sangamon Ave., Gibson City, IL 60936.

M&W

00771039

ASSEMBLY SECTION

Assembly Section 3-1

ASSEMBLY

TRACTOR PREPARATION

Have a tractor with sufficient horsepower and traction. Soil type, soil moisture, type of crop, depth of operation, etc. will determine horsepower and traction requirements. Normally, 25 to 35 horsepower per shank is required. Have your tractor adequately equipped to operate at speeds of 4-1/2 MPH to 6 MPH as this speed will provide the best results.

READ, UNDERSTAND, and FOLLOW the following Safety Messages. Serious injury or death may occur unless care is taken to follow the warnings and instructions stated in the Safety Messages. Always use good common sense to avoid hazards. (SG-2)



All personnel should wear hard hats, safety shoes, safety glasses, and proper hearing protection at all times during the assembly process for protection from injury.



Always read carefully and comply fully with the manufacturer's instructions when handling oil, solvents, cleansers, and any other chemical agent. (SG-22)



Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported or blocked up to prevent sudden or inadvertent falling which could cause serious injury or even death. (SG-14)



The components of this implement are very heavy. Securely lift the components using appropriate and adequate lifting devices. Block all components up securely before working or reaching under components.



Use extreme caution when getting onto the Implement to perform assembly procedures or maintenance. Only stand on solid flat surfaces to ensure good footing. Use a ladder or raised stand to access high spots which cannot be reached from ground level. Slipping and falling can cause serious injury or death.



Use genuine M&W parts and fasteners. These parts are made and tested to M&W specifications. Non-genuine "will fit" parts do not consistently meet these specifications. The use of "will fit" parts may reduce the implements performance, void warranties, and present a safety hazard.

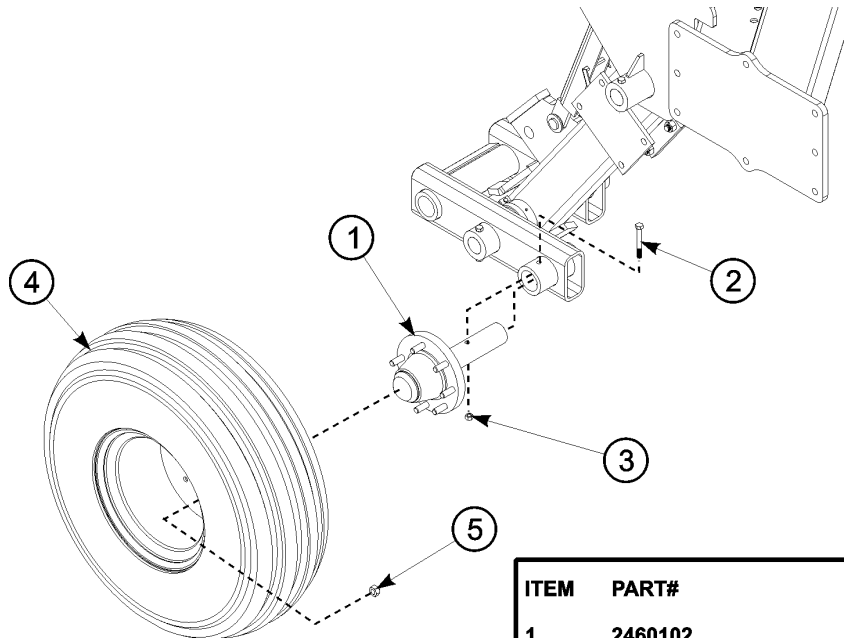


Use caution and wear protective gloves when handling sharp objects such as blades, knives, and other cutting edges. Be alert to worn component surfaces which have sharp edges. Sharp surfaces can inflict severe laceration injuries if proper hand protection is not worn. (SG-37)

ASSEMBLY

INSTALL SPINDLE ASSEMBLIES & TIRES

Spindle Assemblies 2460102, TIRES - 2460136 - 1700 & 2200 OR 2460150 - 2200F & 2500.



ITEM	PART#	DESCRIPTION
1	2460102	Hub and Spindle Assembly
2	314017H5C	Bolt, 1/2"NC x 4 PL5
3	32905C	Nut, 1/2" NC
4	2460136 (1700 & 2200) 2460150 (2500 & 2200F)	Tire and Wheel Assembly
5	913557	Wheel Nut, 5/8"-18 PL

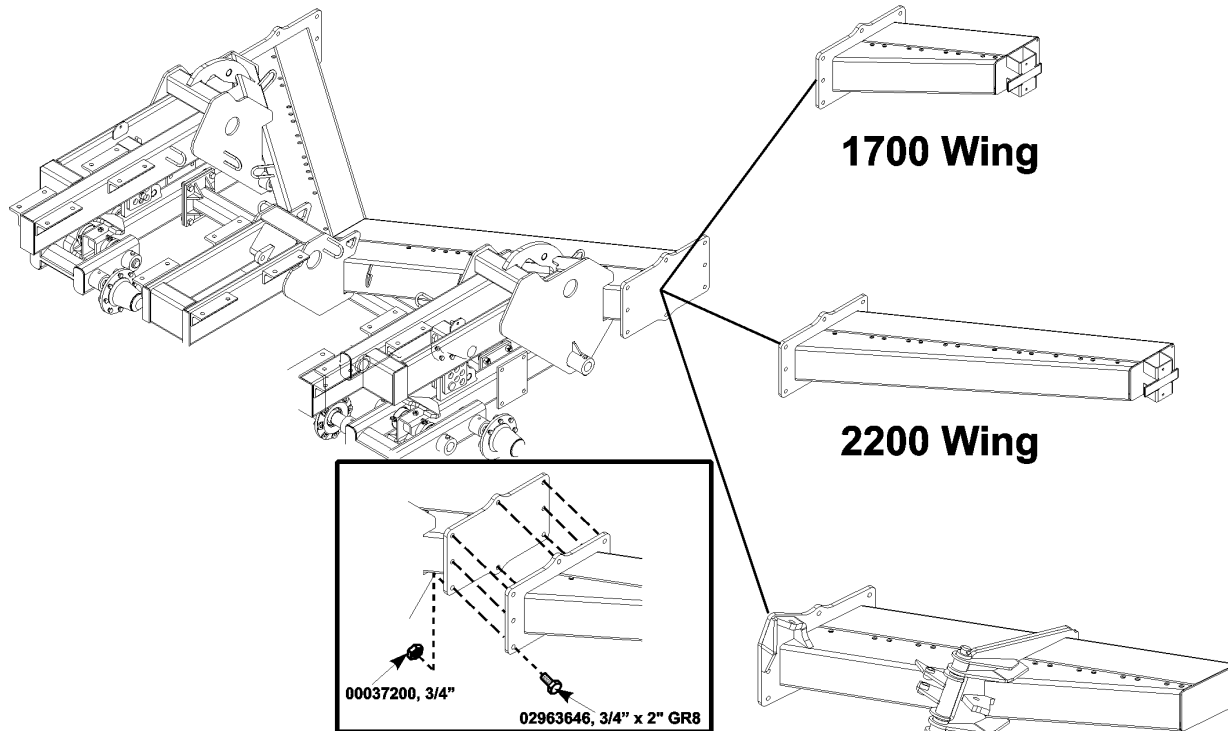
Asm-T-0030

1. Install spindle assembly to wheel strut using NeverSeez® on spindle shaft for easier removal of spindle.
2. Bolt spindle to wheel strut using 1/2" NC x 4 PL5 bolt (2), and 1/2" nut (3).
3. Remove lug nuts from hub. Place tire onto hub.
4. Secure tire onto hub using lug nuts that were removed, making sure that the nuts are tapered towards the rim.
5. Torque wheel nuts to 225 ft.-lbs.

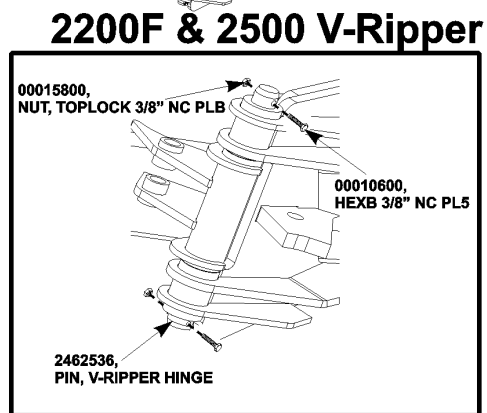
ASSEMBLY

ASSEMBLY

REAR MAINFRAME



ITEM	PART#	DESCRIPTION
1	02963646	Bolt, 3/4"x2" Gr8
2	0037200	Nut, 3/4"NC Toplock GRC PL
3	2462536	Pin, V-Ripper Hinge
4	00010600	Bolt, 3/8" NC PI5
5	00015800	Locknut, TLM 3/8" NC PLC



Asm-T-0031

Installing V-Ripper Extensions or Wings

1700 and 2200:

1. Install outer wing frames using 3/4" x 2" GR8 bolts (1) and locknuts (2)

2200F and 2500:

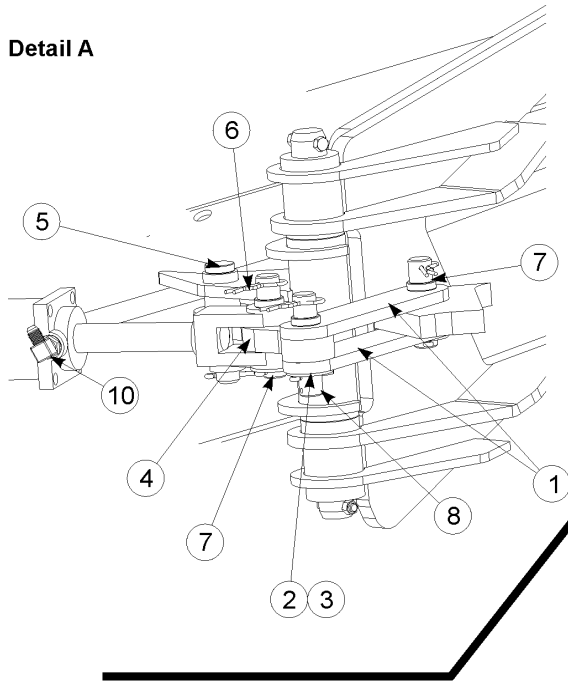
1. Place inner v-ripper frame and outer v-ripper frame on ground beside each other.
2. Connect the two v-ripper frames using 17" v-ripper hinge pin (3).
3. Insert bolts (4) and locknuts (5) to hold hinge pin in place.
4. Install both inner and outer v-ripper frames using 3/4" x 2" GR8 bolts (1) and locknuts (2).
5. Toque 3/4" x 2" GR8 bolts to 400 ft.-lbs.

EM 1700,2200,2200F,2500 04/09

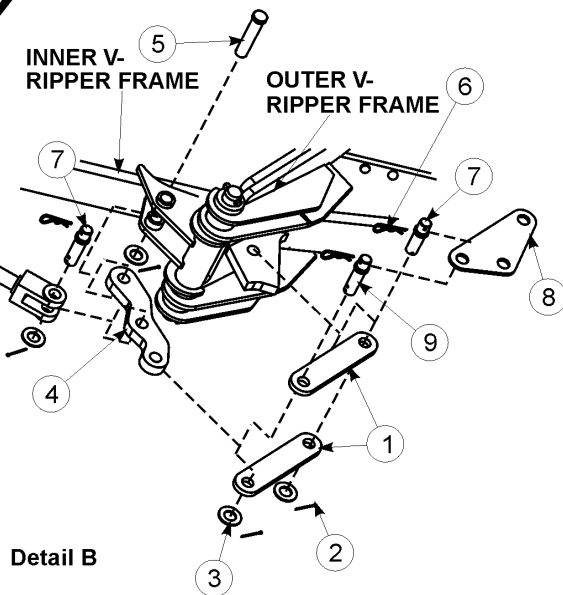
Assembly Section 3-4

ASSEMBLY

Detail A



ITEM	PART#	DESCRIPTION	QTY.
1	2421094	LINK, SHORT LIFT	4
2	00606000	PIN-COTTER 3/16 X 2	8
3	15B1600	WASHER 1 SAE P	6
4	2421095	LINK, LONG LIFT	2
5	2462532	PIN, CYLINDER CLEVIS	2
6	37107B13	CLIP-X HAIR PIN	6
7	2462538	PIN, LIFT LINK SHAFT	2
8	2471045	PLATE, TRANSPORT LOCK	2
9	2462533	PIN, LIFT LINK	4
10	1937156	90° ELBOW FITTING	4



Detail B

Asm-T-0032

V-RIPPER WING CYLINDER (2457104) 3" X 8"

Remove cylinder pins from cylinder, discard pin from rod end of cylinder, it will be replaced with a different pin in a later step.

Remove shipping plugs from cylinder hydraulic ports.

1. Insert 90° elbow fitting (10) into cylinder ports, make sure the ports are on the same side of cylinder. You may have to move steel plug to allow fittings to be installed on the same side of the cylinder. Reinstall the steel plug where shipping plug originally was found.

NOTE: Be aware of orientation of 90° elbow fitting (10) in Detail A when assembling.

2. Connect hydraulic cylinder base to inner V-ripper wing frame by reusing cylinder pin provided with cylinder. Secure pin with cotter pins.
3. Install long lifting link (4) to inner V-ripper frame with long end of link to inner frame using 5-1/4" pin (5) and 1" flat washer (3) and cotter pin 3/16" X 2" (2)

NOTE: Be aware of orientation of long lift link (4) in Detail B when assembling.

4. Install top and bottom lifting link to outer V-ripper frame by inserting 3 7/8" pin (7) into top lifting link and then slide into place on outer V-ripper, then place bottom lifting link on to pin and retain with 1" flat washer (3) and cotter pin 3/16" X 2" (2).
5. Connect top and bottom lifting link to center lifting link with 4 1/2" pin (9) and 1" flat washer (3) and cotter pin 3/16" X 2" (2).
6. Connect V-ripper cylinder to center link arm in middle hole in long lifting link (4) with 4 1/2" pin (9) and 1" flat washer (3) and cotter pin 3/16" X 2" (2).

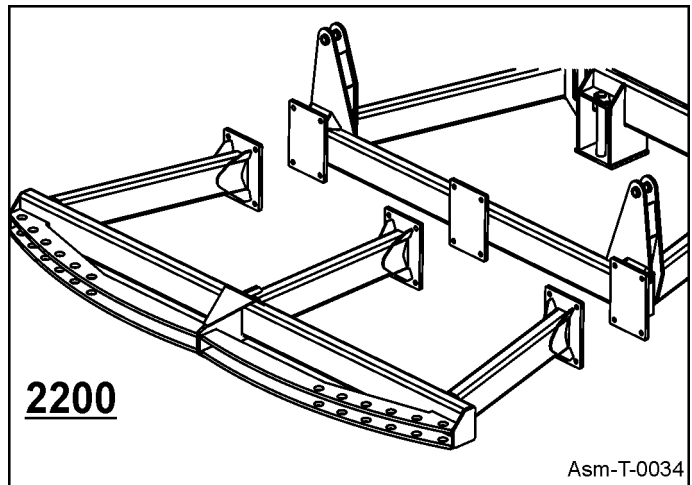
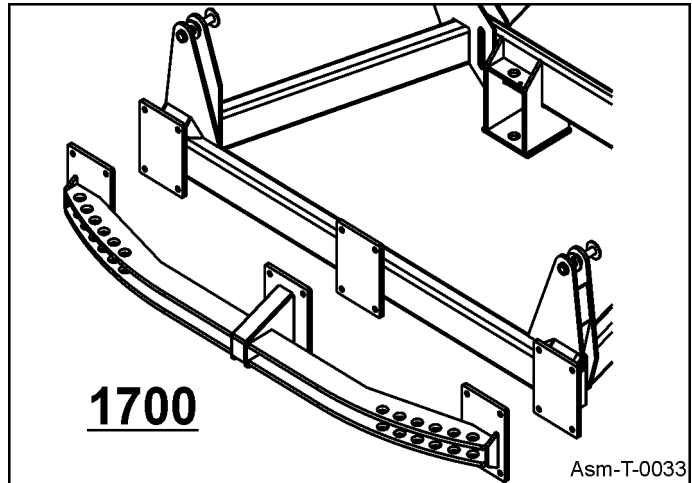
EM 1700,2200,2200F,2500 04/09

Assembly Section 3-5

ASSEMBLY

Connecting Disc Frame - 1700 & 2200

Bolt on outer disc frame rails to main disc frame using 5/8" x 2" GR8 bolts(31607H8C) and lock-nuts(00695100).

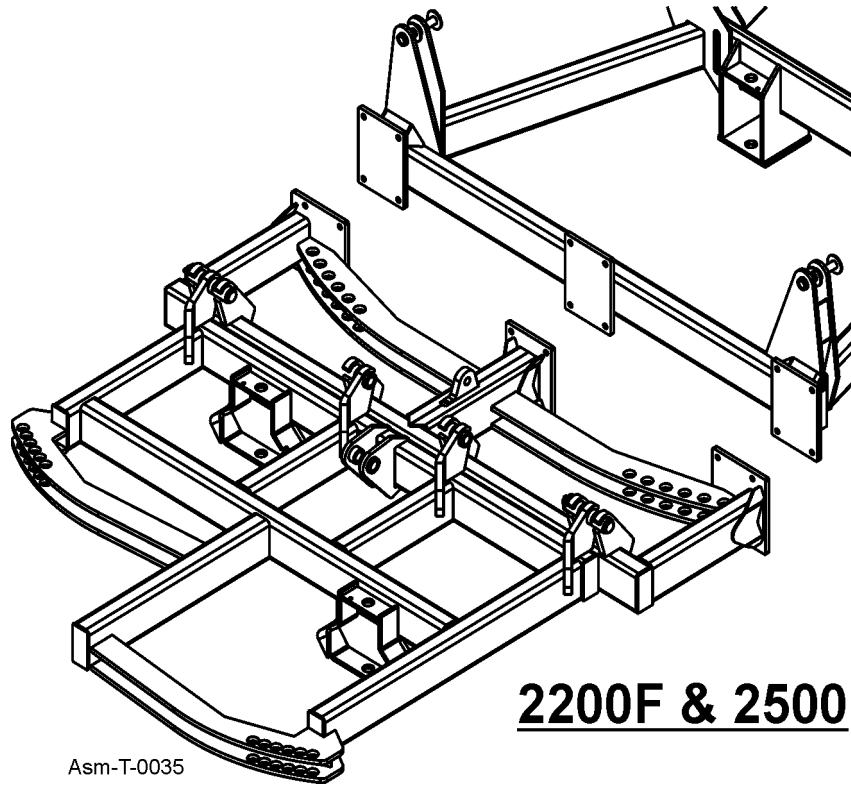


ASSEMBLY

ASSEMBLY

ASSEMBLY

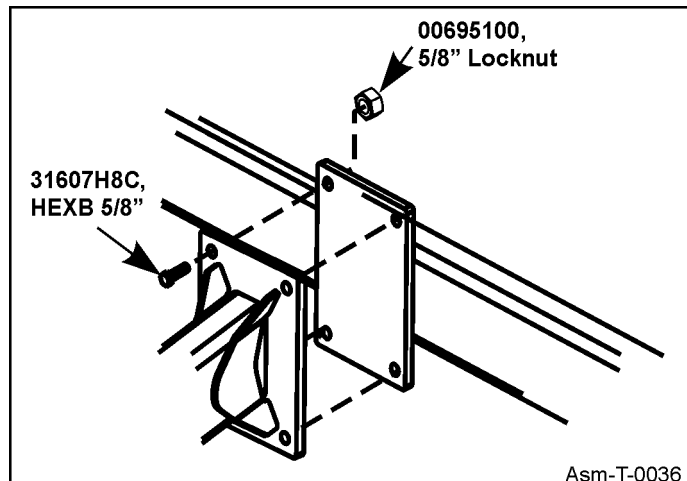
Connecting Inner & Outer Disc Folding Assemblies 2200F & 2500



Inner and outer disc folding wings are already assembled together at factory. Bolt inner and outer folding assemblies to main disc frame using 5/8" x 2" GR8 bolts(31607H8C) and locknuts (00659100).

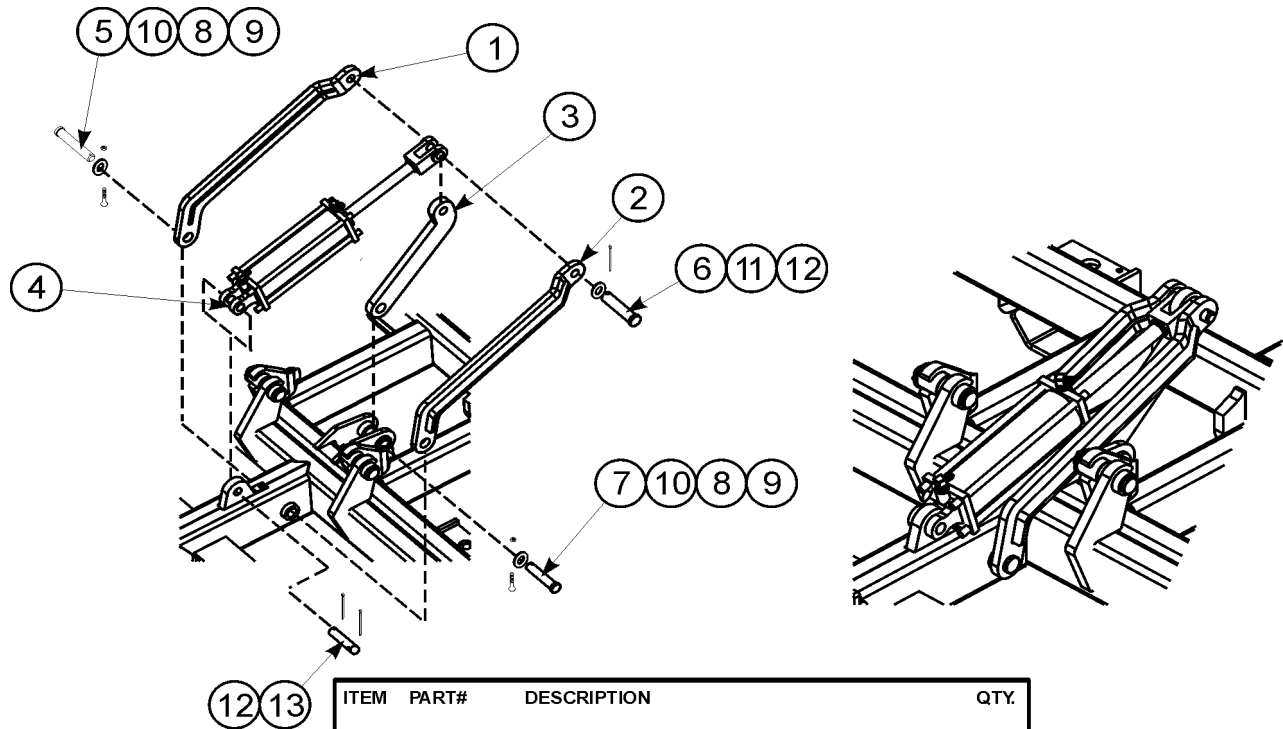
NOTE: See detailed picture, (right), on how to properly line up extensions or wings to disc frame. Always tighten down center plate first in order to make sure outer plates line up properly.

NOTE: Torque to 225 ft.-lbs



ASSEMBLY

ASSEMBLY



ITEM	PART#	DESCRIPTION	QTY.
1	2460330	WDMT, LH WING LIFT LINK (2200F, 2500)	2
2	2460239	WDMT, RH WING LIFT LINK (2200F, 2500)	2
3	2471038	PLATE, LIFT LINK (2200F, 2500)	2
4	2467105	CYLINDER, HYDRAULIC 3-1/2 X 10 (2200F, 2500)	2
5	2462535	PIN, DISC WING PIVOT (2200F, 2500)	6
6	2462532	PIN, CYLINDER CLEVIS (2200F, 2500)	2
7	2462534	PIN, SHORT DISC WING PIVOT (2200F, 2500)	6
8	02766000	HEXB 1/4 NC 1-3/4 PL5	4
9	02959924	NUT, 1/4 NC (2200F, 2500)	8
10	15B2000	WASHER SAE 1-1/4 PLATED (2200F, 2500)	12
11	15B1600	WASHER 1 SAE P (2200F, 2500)	2
12	00606000	PIN-COTTER 3/16 X 2 (2200F, 2500)	14
13		USE PIN ALREADY IN CYLINDER	

Asm-T-0037

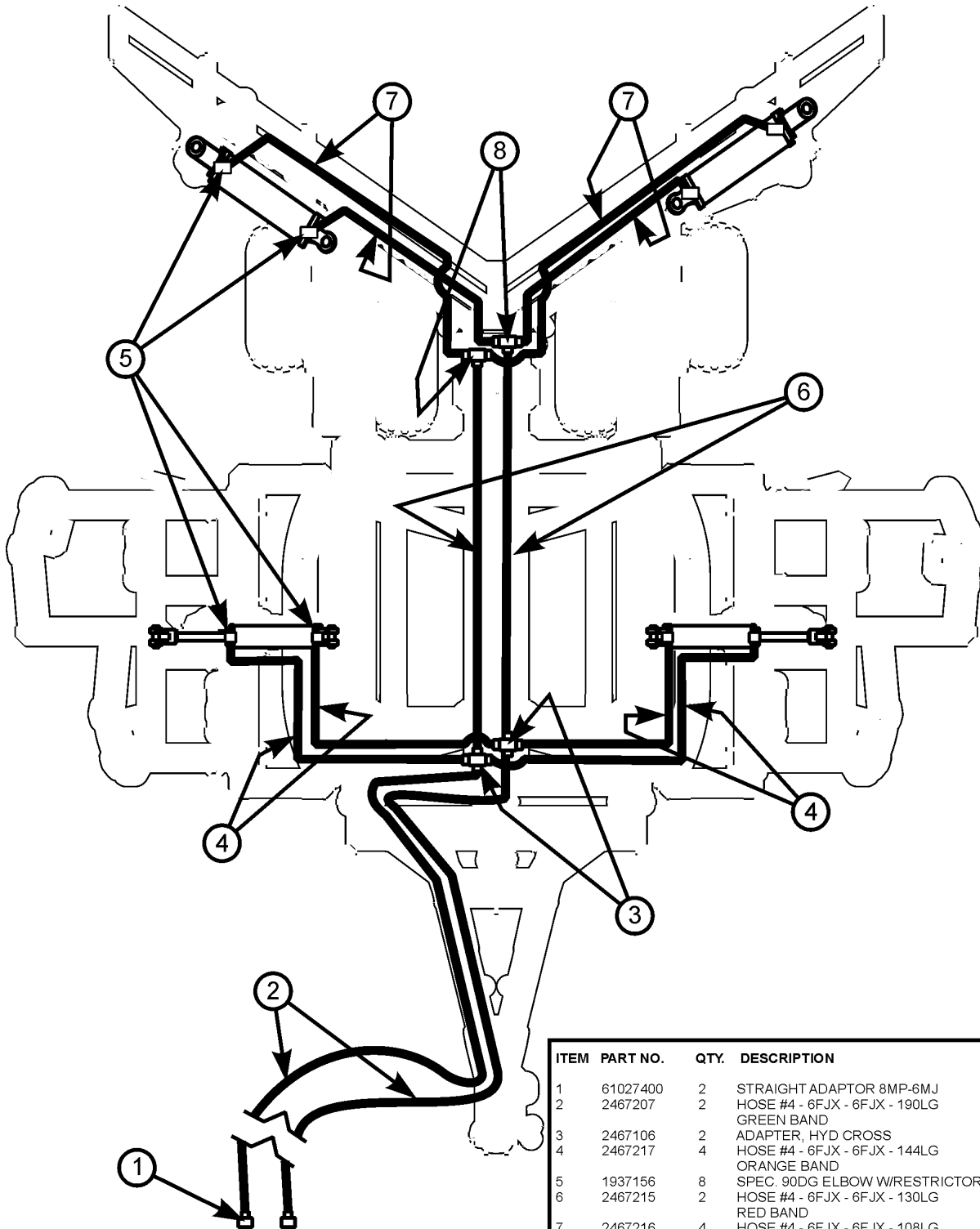
ASSEMBLY

Disc Wing Cylinder (2467105) 3 ½" X 10

1. Remove cylinder pins from cylinder discard pin from rod end of cylinder, it will be replaced with a different pin in a later step.
2. Remove shipping plugs from cylinder hydraulic ports
3. Insert 90° elbow fitting (1937156) into cylinder ports
4. Connect hydraulic cylinder base to inner disc wing frame by reusing cylinder pin provided with cylinder.
5. Secure pin with cotter pins6.Check to make sure clevis on rod end is screwed all the way down to insure proper wing travel.
6. NOTE: Over extension of linkage may result in tearing out hinge lugs on disc wing.
7. Install disc wing lifting links, one left and right per side of machine LH (1) RH (2) to the inner disc wing with pin (5) and retain with 1 1/4" flat washer and cotter pin 3/16" X 2" (12)
8. Install center lifting link to the outer disc wing with pin (7) and retain with 1 1/4" flat washer and cotter pin 3/16" X 2" (12)
9. Extend cylinder rod
10. 10.Connect LH, RH, Center lifting links and rod end of cylinder together with pin (6) and retain with 1" washer(11) and cotter pin 3/16" X 2" (12)

ASSEMBLY

FOLDING WING HOSE SCHEMATIC



Asm-T-0038

ITEM	PART NO.	QTY.	DESCRIPTION
1	61027400	2	STRAIGHT ADAPTOR 8MP-6MJ
2	2467207	2	HOSE #4 - 6FJX - 6FJX - 190LG GREEN BAND
3	2467106	2	ADAPTER, HYD CROSS
4	2467217	4	HOSE #4 - 6FJX - 6FJX - 144LG ORANGE BAND
5	1937156	8	SPEC. 90DG ELBOW W/RESTRICTOR
6	2467215	2	HOSE #4 - 6FJX - 6FJX - 130LG RED BAND
7	2467216	4	HOSE #4 - 6FJX - 6FJX - 108LG BLUE BAND
8	00726792	2	ADP HYD TEE 6MJ - 6MJ - 6MJ

ASSEMBLY

RUN FOLDING WING HYDRAULIC HOSES (2200F or 2500)

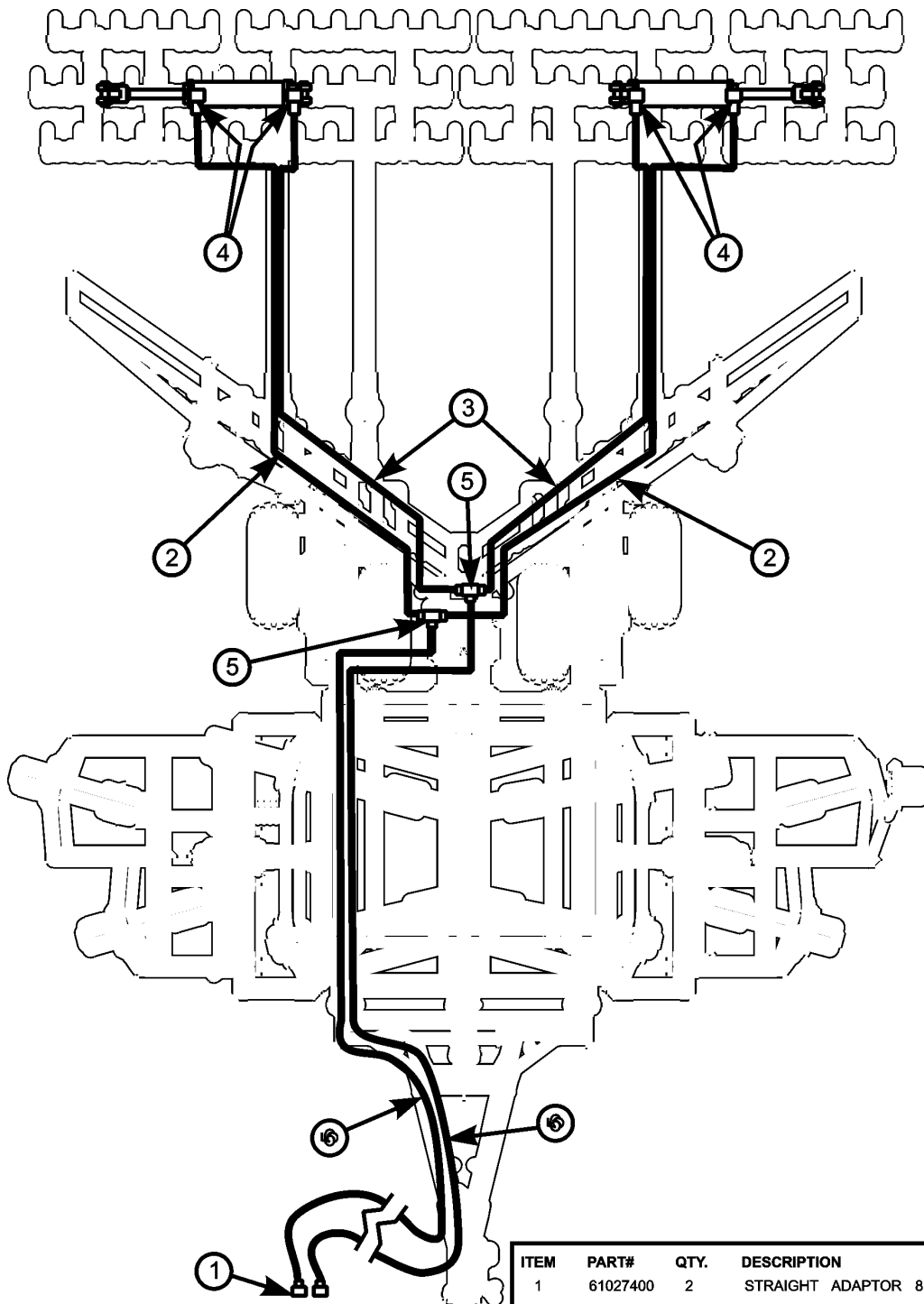
NOTE: While running hydraulic hoses it may be helpful to lay out all hoses to each location before installing. It may also be helpful after laying out hoses to remove the color markings from each end of one hose in each set of two. This will be helpful when connecting hoses to cylinders and fittings for proper function. Example: Hoses with markings to base end of cylinder and hoses with no markings to rod end of cylinder.

1. Start by running green tagged hoses up through retaining rings on right hand side of tongue
2. Then run green hoses through hole on front mainframe just below turnbuckle. (Run hoses through black Kevlar sleeve provided and ty-rap to hold in place. Kevlar sleeve should be attached to hoses where hoses pass through hole in mainframe to prevent premature hose wear.)
3. Install cross fittings (2467106) to green hoses4.Run red tagged hoses through center tube of main disc frame.Note: May need to use an electric wire fish to tie hoses to and then pull through.
4. Connect red hoses to cross fitting on the opposite side of green hoses6.Install orange tagged hoses to other two ports on cross fitting and through hose retainers in V-ripper frame to the disc wing cylinders. Retain hoses to disc frame using the 12 – 24" ty-raps.
5. Run red tagged hoses through opening in rear mainframe next to the main disc frame cylinder.
6. Install T-fittings (00726792) to red hoses.
7. Run blue tagged hoses to V-ripper cylinders.
8. Check all fittings to make sure all connections are on tight.11.Cycle system multiple times to remove all air from lines to insure proper function of sequence valve.

ASSEMBLY

ASSEMBLY

COIL TINE HOSE SCHEMATIC



ITEM	PART#	QTY.	DESCRIPTION
1	61027400	2	STRAIGHT ADAPTOR 8MP-6MJ
2	2467208	2	HOSE #4 - 6FJX - 6FJX - 206LG - YELLOW
3	2467207	2	HOSE #4 - 6FJX - 6FJX - 190LG - GREEN
4	1937156	4	FITTING, 90° ELBOW W/RESTRICTOR
5	00726792	2	ADP HYD TEE 6MJ - 6MJ - 6MJ
6	2467206	2	HOSE #4 - 6FJX - 6FJX - 400LG - RED

Asm-T-0039

EM 1700,2200,2200F,2500 04/09

Assembly Section 3-12

ASSEMBLY

RUN COIL TINE HYDRAULIC HOSES (2200F or 2500)

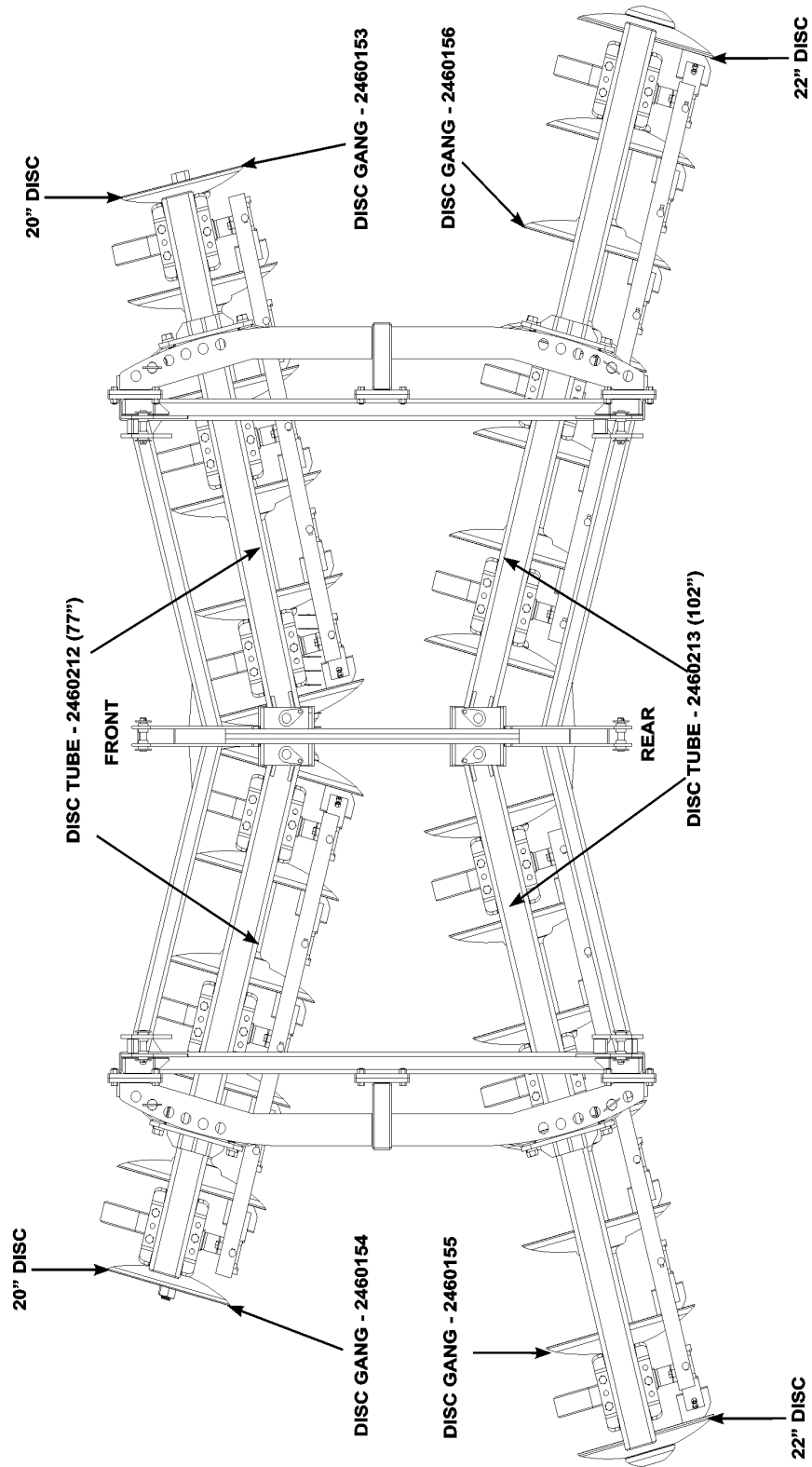
NOTE: While running hydraulic hoses it may be helpful to lay out all hoses to each location before installing. It may also be helpful after laying out hoses to remove the color markings from each end of one hose in each set of two. This will be helpful when connecting hoses to cylinders and fittings for proper function. Example: Hoses with markings to base end of cylinder and hoses with no markings to rod end of cylinder.

1. Start by running red tagged hoses up through retaining rings on the left hand side of the tongue
2. Then run red hoses through left mainframe tube. (Run hoses through black Kevlar sleeve provided and ty-rap to hold in place. Kevlar sleeve should be attached to hoses where hoses pass through hole in mainframe to prevent premature hose wear.) Note: Use of an electric wire fish may be needed to tie hoses to and then pull through.
3. Install tee fittings (00726792) to red hoses.
4. Install yellow hoses to both ports of one tee fitting. Run hoses through hose retainer in V-ripper frame, then down through the outer coil tine tubes and connect to the retract side of both coil tine cylinders.
5. Install green tagged hoses to both ports of the tee fitting and down through outer coil tine tubes and connect to extend side of both coil tine cylinders.
6. Check all fittings to make sure all connections are on tight.
7. Cycle system multiple times to remove all air from lines to insure proper function of sequence valve.

ASSEMBLY

INSTALLING DISC GANGS - 1700

NOTE: All discs are 24" unless noted.



Asm-T-0040

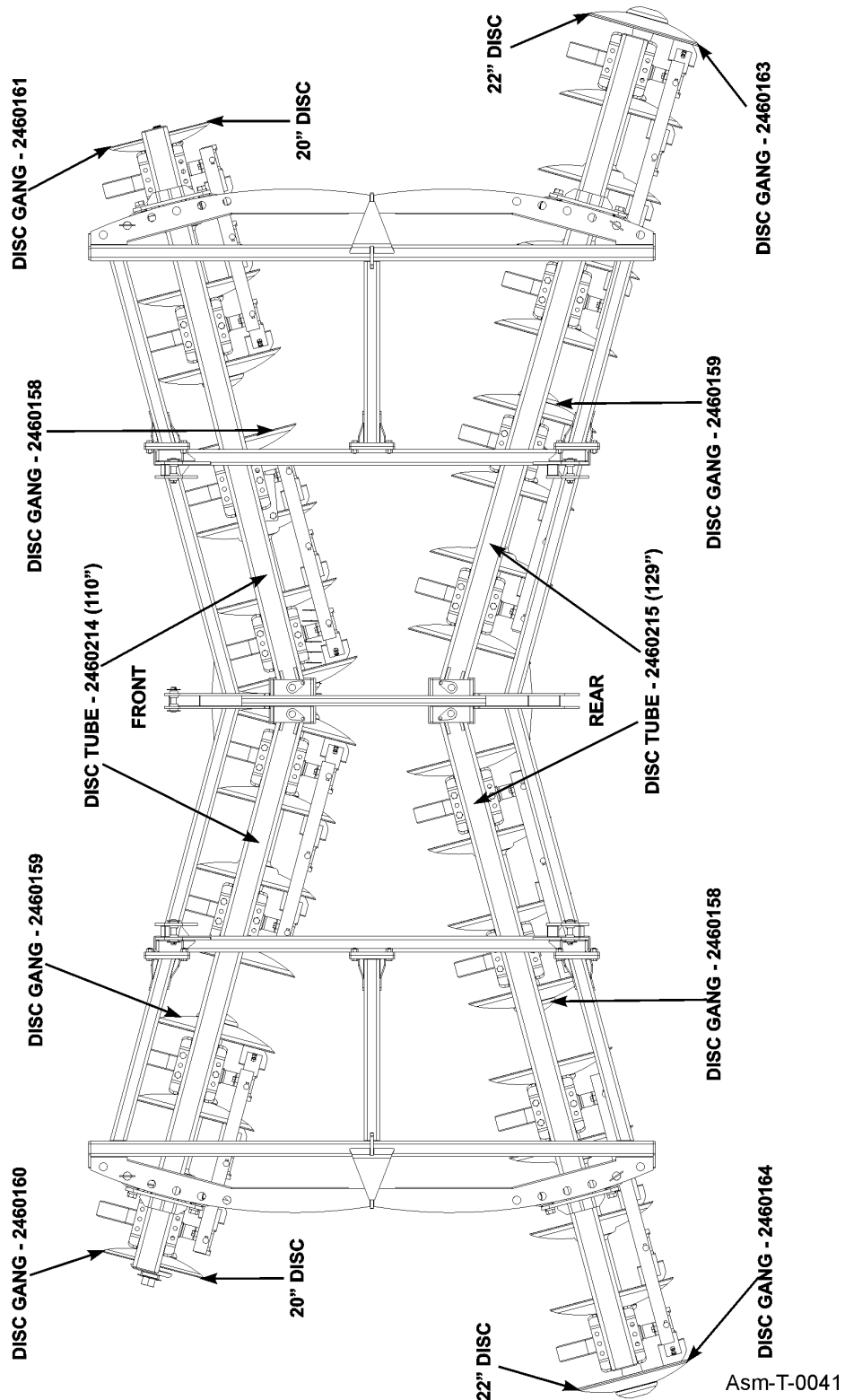
ASSEMBLY

ASSEMBLY

INSTALLING DISC GANGS - 2200

NOTE: All discs are 24" unless noted.

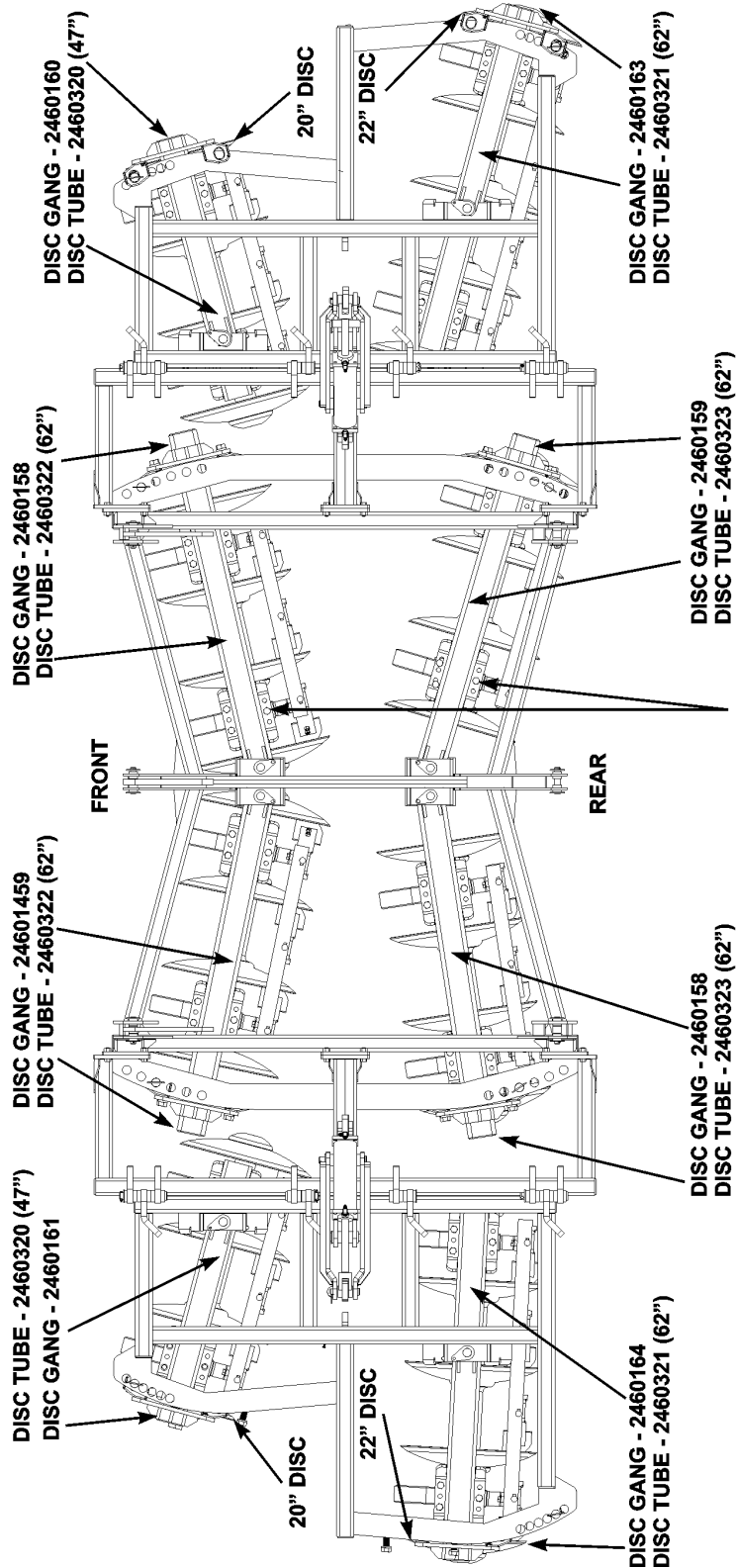
2200



ASSEMBLY

INSTALLING DISC GANGS - 2200F

2200F



NOTE: To differentiate between 2460322 and 2400323 note placement of disc gang mount.

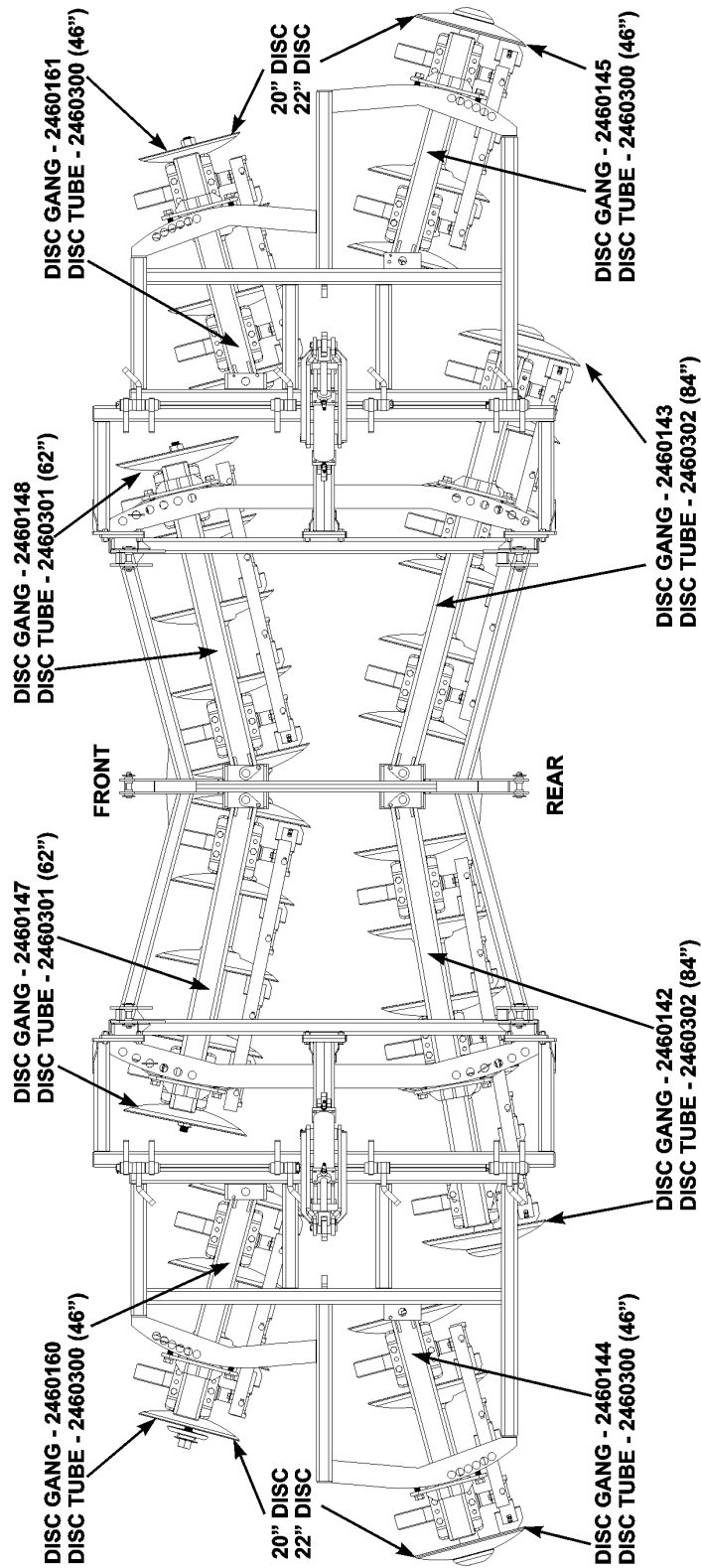
Asm-T-0042

ASSEMBLY

ASSEMBLY

INSTALLING DISC GANGS - 2500

2500



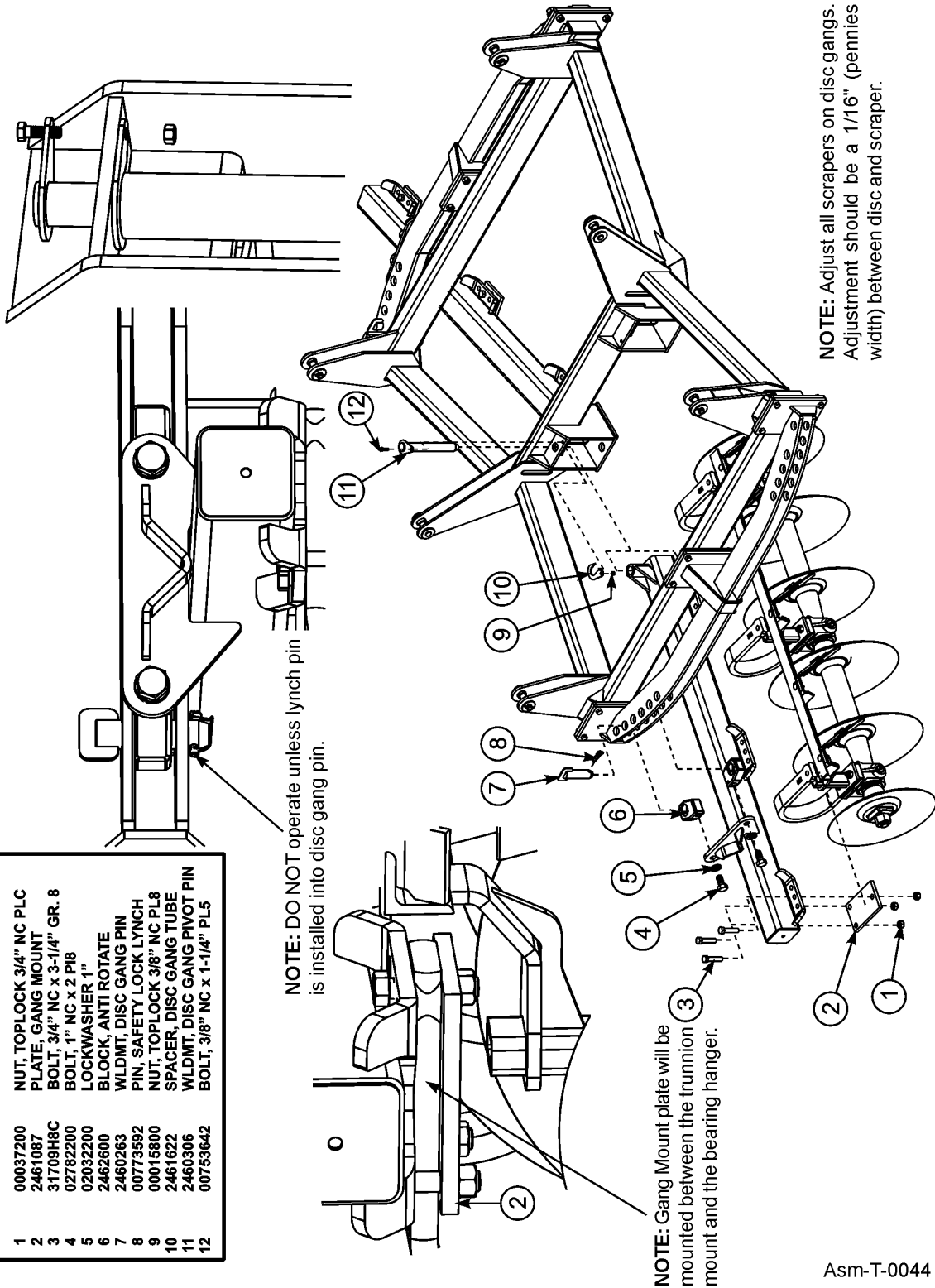
Asm-T-0043

ASSEMBLY

ASSEMBLY

DISC GANG PLACEMENT

ITEM	PART#	DESCRIPTION
1	00037200	NUT, TOPLOCK 3/4" NC PLC
2	2461087	PLATE, GANG MOUNT
3	31709H8C	BOLT, 3/4" NC x 3-1/4" GR. 8
4	02782200	BOLT, 1" NC x 2 P18
5	02032200	LOCKWASHER 1"
6	2462600	BLOCK, ANTI ROTATE
7	2460263	WLDMT, DISC GANG PIN
8	00773592	PIN, SAFETY LOCK LYNCH
9	00015800	NUT, TOPLOCK 3/8" NC PL8
10	2461622	SPACER, DISC GANG TUBE
11	2460306	WLDMT, DISC GANG PIVOT PIN
12	00753642	BOLT, 3/8" NC x 1-1/4" PL5



Asm-T-0044

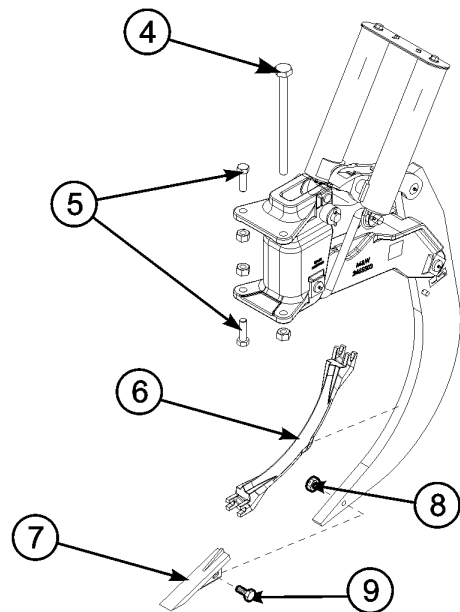
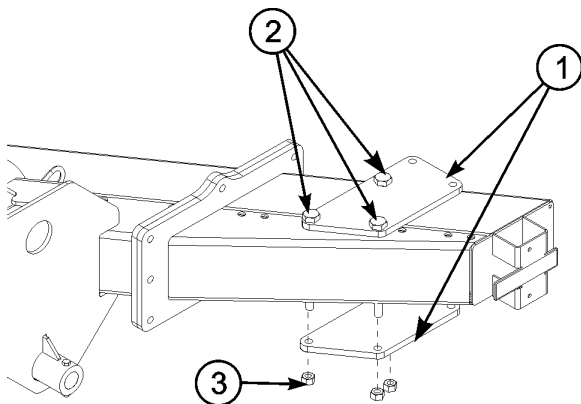
ASSEMBLY

DISC GANG INSTALLATION

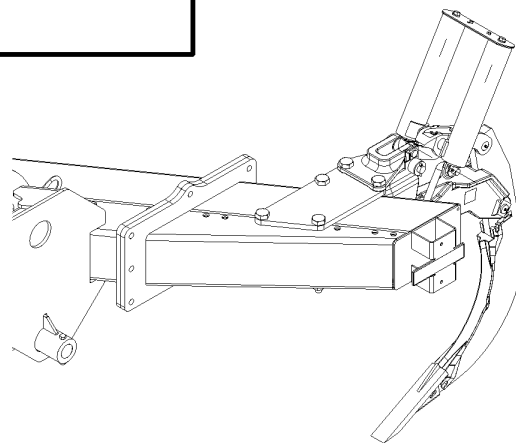
1. Mount gang tubes to disc frame. NOTE: Refer to Assembly Section pages 3-10 through 3-13 for proper placement of discs.
2. Install disc gang pivot pin (11) and spacer plate (10) and retain with 3/8" NC x 1 1/4" PL5 bolt and 3/8" top locknut.
3. Install anti-rotate blocks (6) using 1" NC x 2" PL8 (4) and 1" lockwasher (5). Torque to 750 ft.-lbs.
4. Install disc gang pin (7) into disc frame rail, locking gang tube into a fixed position and secure with lynch pin (8). NOTE: On 200, 200F, and 2500 begin by installing inner disc gang assemblies then outer gang assemblies.
5. Place disc gang on ground with the C-cushion facing forward and the scrapper bar upwards.
6. Loosen scraper mount bar (the angle iron) slightly, but do not remove, by loosening the 5/8" x 2 1/2" bolts. This will allow for the C-cushions to properly align with the hole in the gang tubes during disc gang assembly installation.
7. Install disc gang assembly to gang tube by lifting assembly into place with the assistance of an overhead crane or fork truck.
8. Mount C-cushion to gang tube by clamping C-cushion with gang mount plate (2) and using 3/4" NC x 3 1/4" GR8 bolts (3) and 3/4" NC PLC locknuts (1). The hole in the C-cushion should align with the rear center hole in the gang tube. Torque to 335 ft.-lbs.
9. Retighten scraper mount assemblies, adjusting scrapers so there is a 1/16" gap between the scrapers and the discs.

ASSEMBLY

ASSEMBLY



ITEM	PART#	DESCRIPTION
1	2461080	PLATE, SHANK MOUNT
2	02958113	HEXB (2 CENTER, 3 LH or RH) 3/4" x 11" PI8
3	00037200	NUT, 3/4" GR.8
4	02959091	HEXB (1 LH or RH) 3/4" x 12" GR.8
5	03200261	HEXB, 3/4" x 3" GR.8
6	2465505	WEAR SHIN
7	2460282 2450269 (OPTIONAL) 2460283 (OPTIONAL)	WLDMT, STRAIGHT POINT WLDMT, WING POINT WLDMT, CHISEL POINT
8	32905C	NUT, 1/2" NC
9	02027400	HHCS 1/2" NC 2-1/4" PL5



Asm-T-0045

ASSEMBLY

INSTALL SHANK MOUNT PLATES AND SHANKS TO V-RIPPER FRAME

1. Place shank mount plates (1) on top of v-ripper frame.

NOTE: Center shank mounts plates are square and different from others.

2. Align shank mount plates with correct holes in frame to achieve desired shank placing.

NOTE: See diagram on page 3-18. Install three (3) $\frac{3}{4}$ " x 11" GR5 bolts (2) through forward holes in mount plate.

3. Install lower mount plate on bolt end and retain with $\frac{3}{4}$ " locknut (3)

INSTALL SHANKS

Support shank assembly with strap or chain connected to top pull arm.

Align holes in shank mount with shank mount plates.

4. Install one (1) $\frac{3}{4}$ " X 12" bolt (4) and two (2) $\frac{3}{4}$ " x 3" bolts (4) as shown. Retain with $\frac{3}{4}$ " locknuts (3).
5. Install wear shin (6) and straight point (7) to shanks using $\frac{1}{2}$ " NC 2 $\frac{1}{4}$ " PL5 hex bolt (9) and $\frac{1}{2}$ " nut (8).

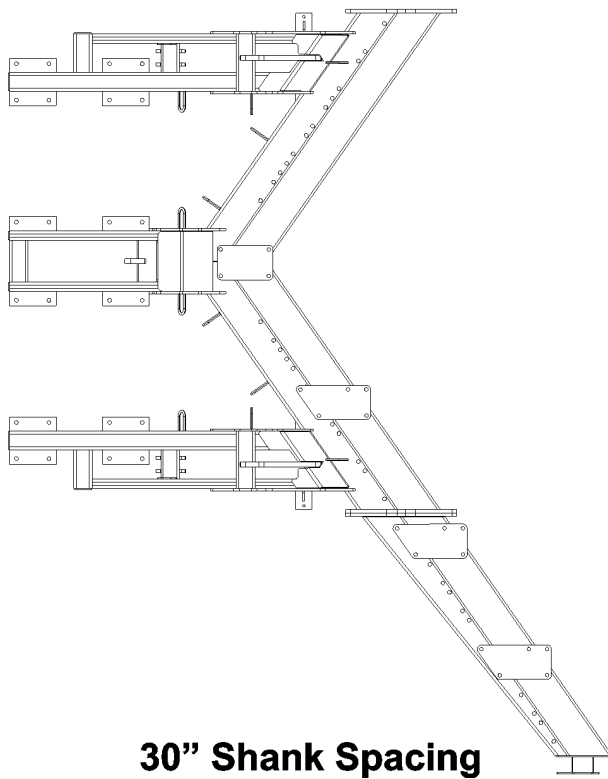
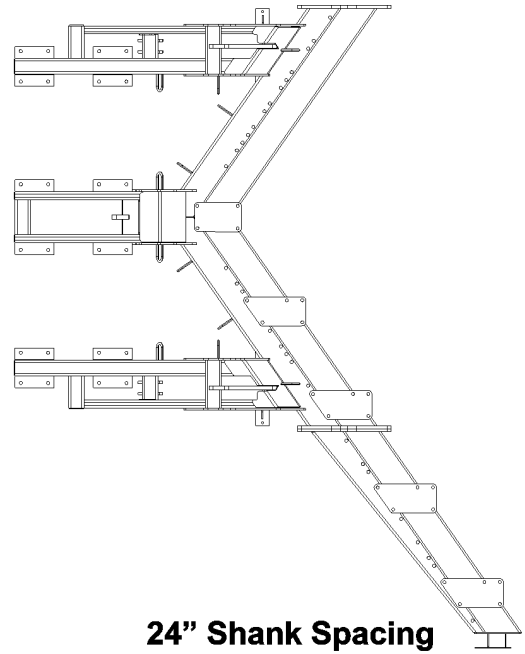
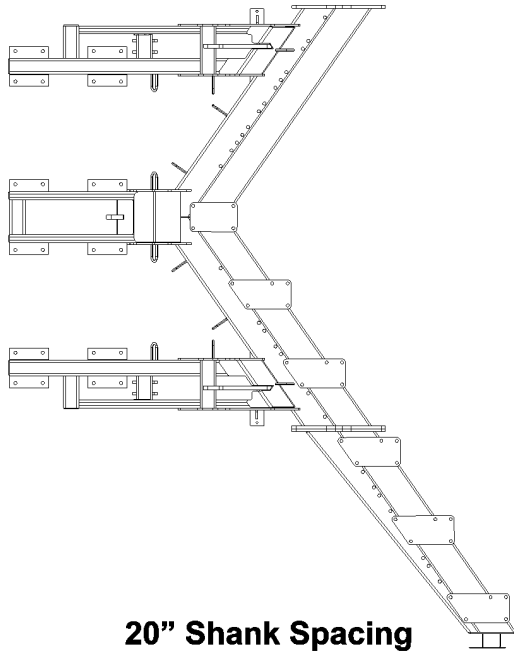
Refer to Figure Asm-T-0045

NOTE: Torque all bolts evenly to 250 ft.- lbs. starting with bolts through main frame.

ASSEMBLY

ASSEMBLY

SHANK MOUNT PLATE ALIGNMENT

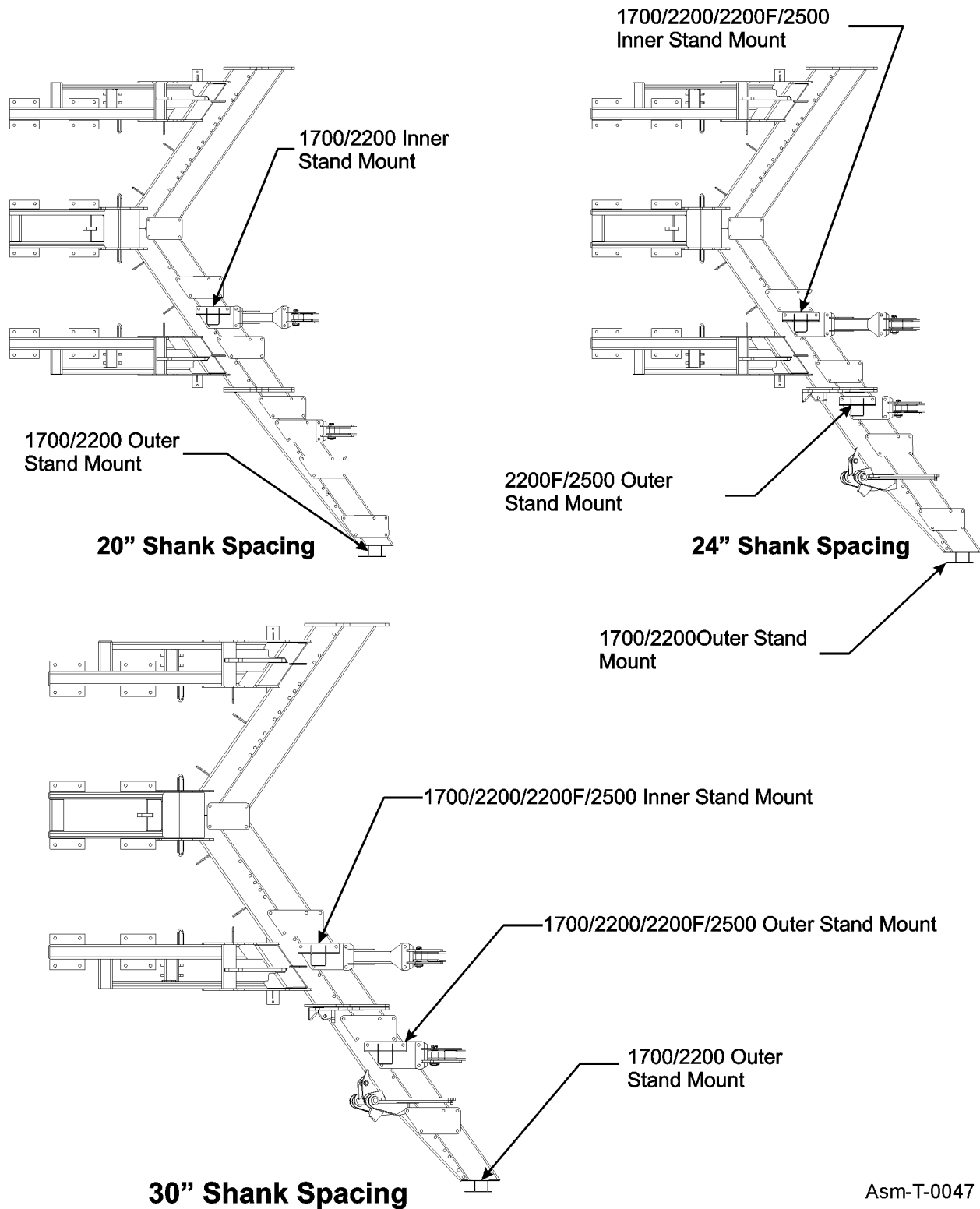


Asm-T-0046

ASSEMBLY

ASSEMBLY

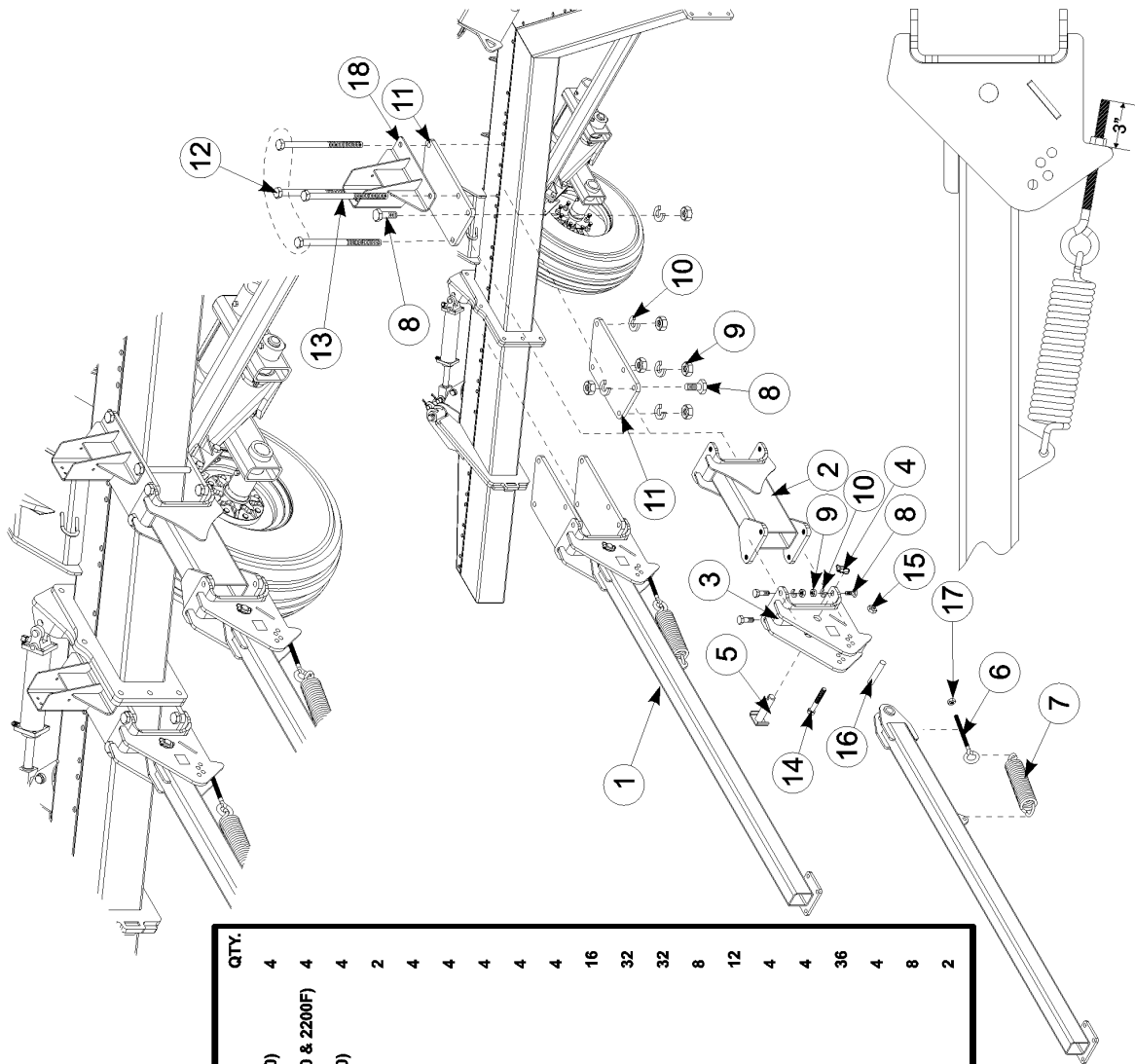
COIL TINE LEVELER MOUNT PLATE ALIGNMENT



ASSEMBLY

ASSEMBLY

COIL TINE LEVERLER



ITEM	PART#	DESCRIPTION	QTY.
1	2460292	WLDMT, SHORT MOUNT TUBE (1700)	4
	2460291	WLDMT, SHORT MOUNT TUBE (2200 & 2200F)	4
	2460289	WLDMT, SHORT MOUNT TUBE (2500)	4
2	2460290	WLDMT, MOUNT EXTENSION	2
3	2460289	WLDMT, MOUNT	4
4	00773592	PIN, SAFETY LOCK LYNCH	4
5	2460304	WLDMT, PIVOT PIN	4
6	2468402	BOLT, EYE	4
7	2467421	SPRING, EXTENSION	4
8	00037100	HEXB 3/4" NC 2-1/2 PI5	16
9	00000200	NUT 3/4" NC HEX PL	32
10	35009C	LOCKWASHER, 3/4"	32
11	2461080	PLATE, SHANK MOUNT	8
12	317026H5C	HEX CAP 3/4"-10 x 12 GR.5	12
13	317028H5C	HEX CAP 3/4"-10 x 11 GR.5	4
14	02957007	HHCS 5/8" NC 5 PI8	4
15	00695100	NUT, TOPLOCK 5/8" NC PLB	36
16	2464878	BUSHING	4
17	0001040	NUT, 5/8" NC HEX PL	8
18	2460260	MID MOUNT BRACKET	2

Asm-T-0048

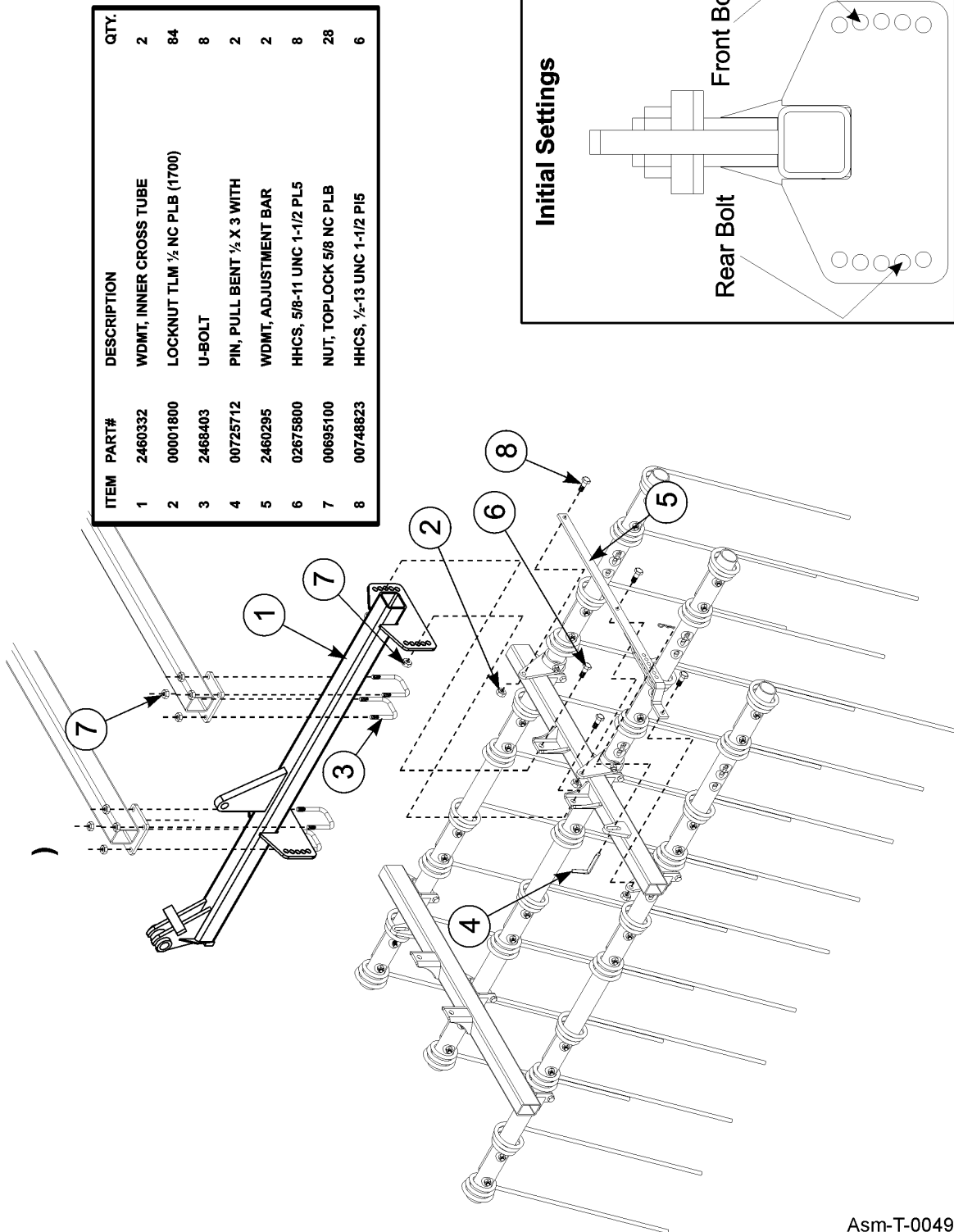
ASSEMBLY

INSTALLING SHANK MOUNT TUBES

1. Place leveler mount plates (11) on top of V-ripper frame.
2. Place mid mount light brackets (18) on top of the inner mounts. (All models)
3. Place mid mount light brackets (18) on top of the outer mounts. (2200F & 2500)
4. Align mount plates and light brackets with correct holes depending on shank spacing. See diagram on page 3-19. Install three 3/4" x 11" GR5 bolts (12) through the forward holes of mounts and through the V-ripper frame. See diagram on page 3-20.
5. Install lower mount plates (11) on bolt end and retain with 3/4" lock washer (10) and 3/4" lock washer (10) and 3/4" nut (9).
6. Align holes on mount extension (2) with holes on the inner two mount plates.
7. Install one 3/4" x 12" GR5 bolt (13) and two 3/4" x 3" GR5 bolts (8) as shown. Retain with 3/4" lock washer (10) and 3/4" nut (9).
8. Align holes on leveler mount (3) with holes on extension mounts.
9. Install four 3/4" x 3" GR5 bolts (8) and retain with 3/4" lock washer (10) and 3/4" nut (9).
10. Align holes on leveler mount (3) with holes on outer mount plates.
11. Install one 3/4" x 12" GR5 bolt (13) and two 3/4" x 3" GR5 bolts (8) as shown. Retain with 3/4" lock washer (10) and 3/4" nut (9).
12. Install stop height bushing (16) into each leveler mount using one 5/8" x 5" GR8 bolt (14) and top lock nut (15).
13. Install leveler tubes (1) in leveler mounts (3) by using pivot pin (5) and lynch pin (4).
14. Set tension on coil line by installing down pressure springs (7) on leveler tubes and tightening down eye bolt (6) using two 5/8" nuts (17) until there is 3" of thread out the back of mount.

ASSEMBLY

COIL TINE LEVERLER (1700)



Asm-T-0049

ASSEMBLY

INSTALLING COIL TINE LEVELER (1700)

1. Attach inner cross tube(1) to coil tine assemblies and retain with 5/8" x 1 1/2" bolts (6) and 5/8" lock nut (7).

Note: Coil tine angle is set by which bolt hole you select. (See diagram 3-26)

2. Lift coil tine assembly to end of Wdmt short mount tubes and retain with U bolts (3) and 5/8" locknut (7). Two U-bolts will be used per mount tube.

Note: For proper spacing there should be 10" between rear middle tines.

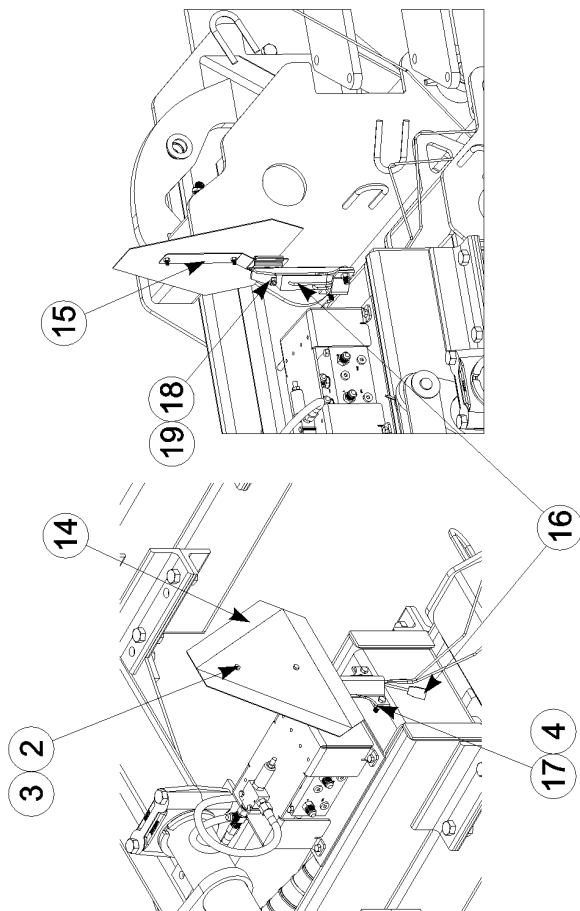
3. Attach adjustment bar (5) to coil tine adjustment plates and secure with 1/2" x 1 1/2" bolts (8) and 1/2" locknuts(2).

Note: only lightly tighten bolts so adjustment will be easier.

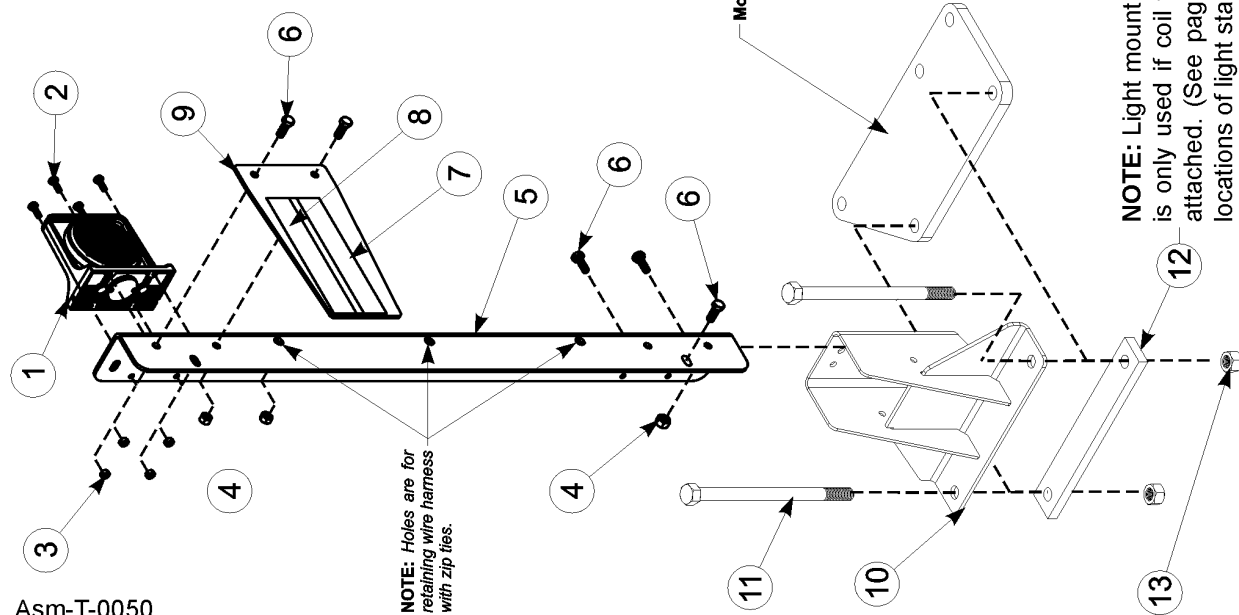
4. Secure adjustment bar (5) with pull pin (4) and hair clip pin.

Note: Coil tine pressure will be set by which pin hole you select.

ASSEMBLY



ITEM	PART#	DESCRIPTION
1	00726957	*LIGHT, SINGLE AG-AMB/AMB (Installed on outside light stands)
2	00726956	*LIGHT, SINGLE AG-RED/BLACK (Installed on inside light stands)
3	00021400	HEXB, 1/4 NC X 3/4 PL5
4	32901C	HEX LOCKNUT 1/4-20
5	15800	NUT, TOPLOCK 3/8 NC
6	2461604	BRACKET, UPRIGHT LIGHT
7	00011400	HHCS 3/8 NC X 1 PL5
8	1458398	DECAL, ORANGE REFLECTOR
9	1458392	DECAL, RED REFLECTOR
10	2461623	PLATE, LIGHT BRACKET
11	2460260	WDMT, MID MOUNT BRACKET
12	317024H5C	HEXB, 3/4 NC X 10 PL5
13	2461415	STRAP, LIGHT MOUNT
14	00037200	NUT, 3/4-10 CENTERLOCK
15	3200347	EMBLEM, SMV
16	2348621	SPADE BRACKET, SMV MOUNTING
17	00726963	HARNES, WISHBONE - 10'
18	00753642	HHCS 3/8 NC X 1-1/4 PL5
19	3263N6C	PAN HEAD SCREW 10-24 X 1/2
20	329023C	HEX LOCKNUT #10-24
	00726964	MAIN HARNES - (NOT SHOWN)



ASSEMBLY

INSTALLING LIGHT KIT UPRIGHTS AND LIGHTS

NOTE: It may be easier to assemble light uprights using a bench vise before installing light assembly to mounting brackets on machine.

1. Install reflector plate to upright using two (2) 3/8" X 1 1/4" bolt (00753642) and retain with 3/8" lock nut (00015800).
2. Install red reflector decal to the top of reflector plate and orange reflector to bottom of reflector plate so that both are facing the rear of machine.
3. Install light to upright using 3/8" bolt (00011400) and retain with 3/8" locknut (00015800).
4. Install each light kit upright assembly to each mounting brackets using three (3) 3/8" x 1 1/4" bolt (00753642) and retain with 3/8" locknut (00015800).

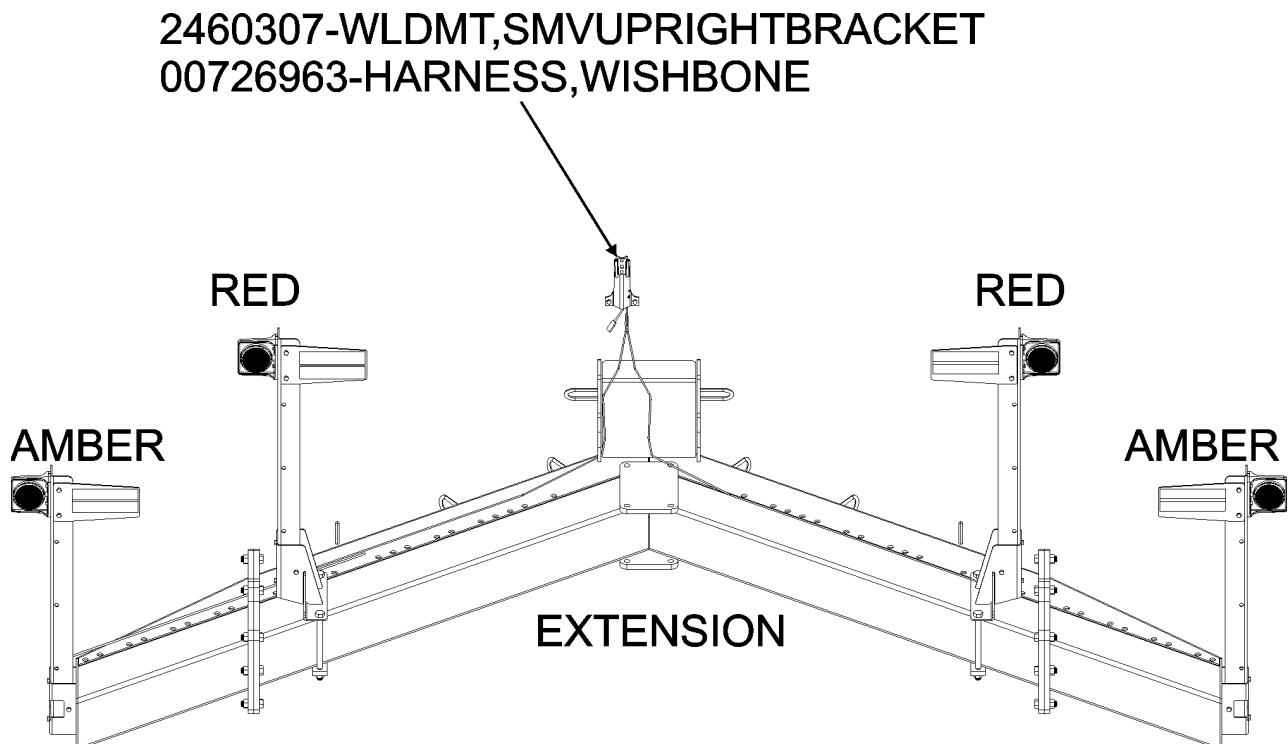
NOTE: 1700 and 2200 outer mounting brackets are located on the outer edge of the v-ripper frame.

NOTE: Light mount strap (12) is only used if coil tine is not attached.

5. Install wiring harness wishbone (00726963) to SMV sign mount using bolt (3263N6C) and retain with locknut(329023C).
6. Run wiring harnesses to each side of machine indicated on each wire through the hose retainers on rear mainframe to center (or red light standards) and connect harness connections to the light.

INSTALL SMV SIGN MOUNT

1. Install SMV sign mount (2460307) to rear mainframe using 3/8" x 1 1/4" bolt (00753642) and retain with 3/8" locknut (00015800).

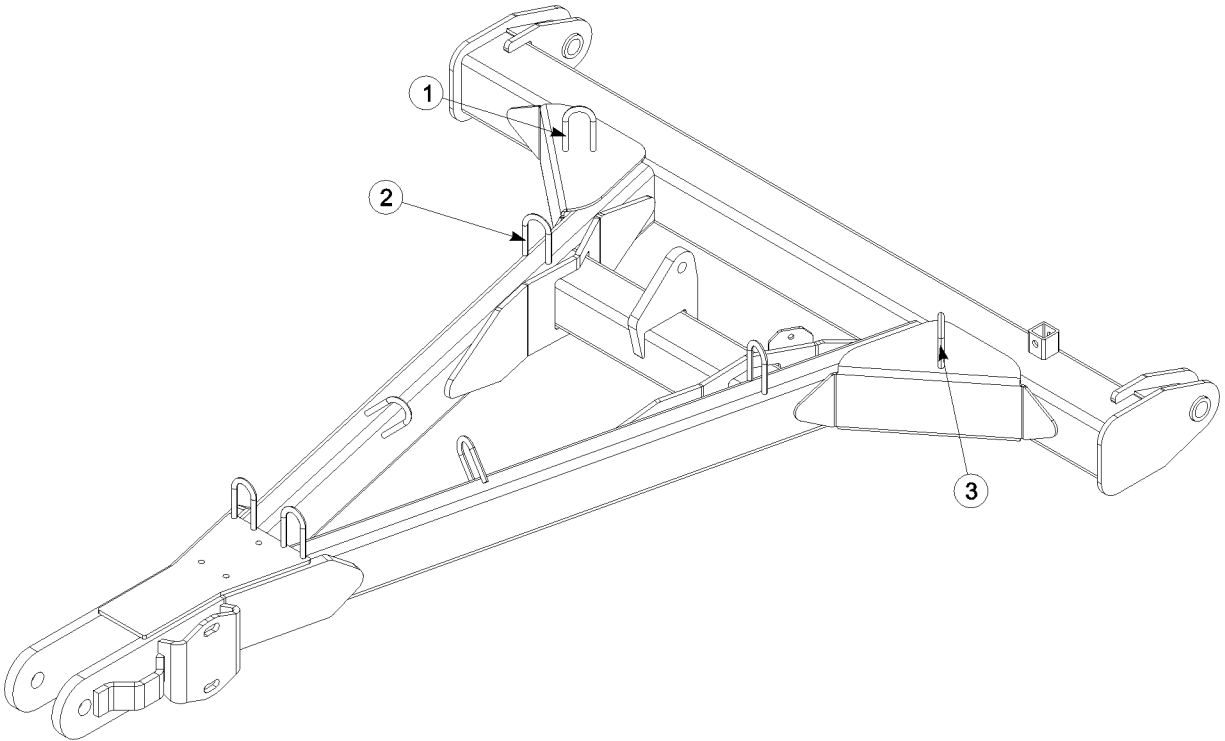


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ASSEMBLY

ASSEMBLY

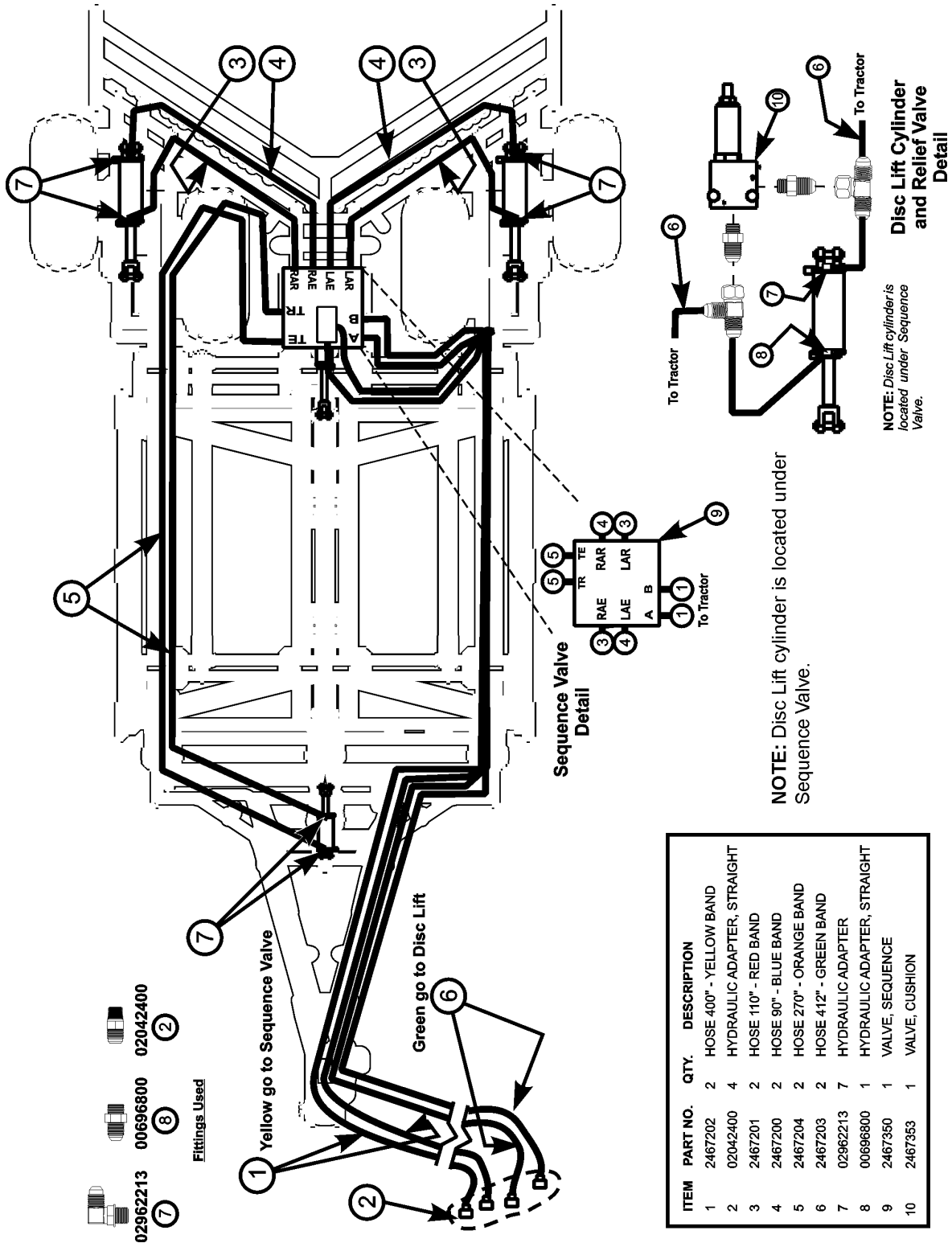
HOSE TIE DOWN



1. Zip-tie two orange banded hoses (2467204) to hose retainer (2).
2. Zip-tie two red banded hoses (2467206) and two green banded hoses (2467207) to hose retainers (1 & 2).
3. Zip-tie two yellow banded hoses (2467202) and two green banded hoses (2467203) two hose retainers (3).

ASSEMBLY

HOSE SCHEMATIC



ASSEMBLY

ASSEMBLY

ASSEMBLY



Make certain that the "Slow Moving Vehicle" (SMV) sign is installed in such a way as to be clearly visible and legible.



Always maintain the safety signs in good readable condition. If the safety signs are missing, damaged, or unreadable, obtain and install replacement safety signs immediately. (SG-5)



Ensure the unit is properly lubricated as specified in the lubrication schedule and all bolts and nuts are properly torqued. Failure to properly assembly and maintain this Implement in good operating condition could cause component failure and possible serious injury or even death



Never attempt to lubricate, adjust, or remove material from the Implement while it is in motion or while tractor engine is running. (SG-20)



Do not modify or alter this Implement. Do not permit anyone to modify or alter this Implement, any of its components or any Implement function. (SG-8)



On a fully assembled unit, do not release the Wing Retaining Strap until the hoses are attached to the tractor and the Wing Cylinders are filled with oil. Always keep bystanders away while raising and lowering the wings

To lower the wings, hook the hydraulic hoses to the tractor. From the Operators Seat use the tractor hydraulic control levers to fill wing cylinders with oil. Keep coworkers and bystanders away from the implement while filling. For implements with the wings in the raised or transport position, filling the cylinders should raise the wings slightly and loosen the wing retaining lock. DO NOT release the wing Transport Bar/Latch if there is a force on the lock. Use tractor hydraulic control levers to lower the wing(s). Continue to hold the control lever until both wings are down and the wing cylinders are fully retracted or extended. Continue to cycle the cylinders several times by raising and lowering the wings fully to remove any trapped air. If there is sponginess during the raising cycle, this may indicate that air is entrapped in the hydraulic circuit. Continue to cycle the cylinders until all sponginess is removed.

The implement wings should lower slowly when they are allowed to float down and are not powered down. This is a safety feature built into the system. If the wings fall rapidly, have the cylinders repaired before operating the implement. *Asm-0002*



ASSEMBLY

ASSEMBLY

DEALER ASSEMBLY PREPARATION CHECKLIST FOR THE EARTH MASTER

	Item	Completed
1	All parts are assembled or accounted for.	
2	The Operator's Manual is in the manual canister	
3	The serial number tag is in place and readable	
4	All Safety warning decals are on the unit, readable and in good condition	
5	The SMV sign is securely attached to the implement	
6	The safety tow chain is properly attached to the implement tongue	
7	The tongue jack is in place on the implement	
8	All nuts, bolts and fasteners are properly installed and tightened to the specified torque	
9	All hydraulic fittings are tight	
10	No oil leaks are present	
11	All cylinders and hoses are filled with oil	
12	The hydraulic hoses are routed correctly and do not rub against sharp edges	
13	Electrical connections are secure	
14	Implement lights operate properly	
15	The tires are properly inflated to the recommend air pressure	
16	The wheel lug bolts are tight	
17	The tires properly clear implement frame and discs	
18	The wheel hub bearings are properly greased	
19	All pivot points have been properly lubricated	
20	Does the implement paint look complete and acceptable	

OPERATION SECTION

OPERATION

OPERATION

M&W EARTHMASTER 1700, 2200, 2200F & 2500 OPERATION INSTRUCTIONS

The tillage implement is manufactured with quality material by skilled workers. This implement is ideal in horticultural, agricultural, or commercial applications, especially for landscapers, rental yards, vineyards, vegetable farms, and nurseries. The implement is equipped with protective deflectors to prevent objects being thrown from the implement by the blades, however, no shielding is 100% effective. All shields, guards, and deflectors equipped on the unit must be maintained on the implement in good operational condition.

It is the operator's responsibility to be knowledgeable of all potential operating hazards and to take every reasonable precaution to ensure oneself, others, animals, and property are not injured or damaged by the implement, tractor, or a thrown object. Do not operate the implement if passersby, pets, livestock, or property are directly in front or to the rear of the unit.

This section of the Operator's Manual is designed to familiarize, instruct, and educate safe and proper implement use to the operator. Pictures contained in this section are intended to be used as a visual aid to assist in explaining the operation of a tillage implement. Some pictures may show shields removed for purposes of clarity. NEVER OPERATE this implement without all shields in place and in good operational condition. The operator must be familiar with the implement and tractor operation and all associated safety practices before operating the implement and tractor. Proper operation of implement, as detailed in this manual, will help ensure years of safe and satisfactory use of the implement.

IMPORTANT: To avoid implement damage, retorque all bolts after the first 10 hours of operation. Refer to the Torque Chart at the end of the Maintenance Section to ensure bolts are properly tightened.

READ AND UNDERSTAND THE ENTIRE OPERATING INSTRUCTIONS AND SAFETY SECTION OF THIS MANUAL AND THE TRACTOR MANUAL BEFORE ATTEMPTING TO USE THE TRACTOR AND IMPLEMENT. If you do not understand any of the instructions, contact your nearest authorized dealer for a full explanation. Pay close attention to all safety signs and safety messages contained in this manual and those affixed to the implement and tractor. *OPS-U-0001*

READ, UNDERSTAND, and FOLLOW the following Safety Messages. Serious injury or death may occur unless care is taken to follow the warnings and instructions stated in the Safety Messages. Always use good common sense to avoid hazards. (SG-2)



OPERATION

1. Standard Equipment and Specifications

	1700	2200
Overall Length	28'	29'-6"
Transport width	17'	22'
Height	87'-3/4"	87'-3/4"
Disc Working Width(18 degree)	16'-8"	21'-5"
Disc Working Width(3 degree)	17'	22'
Lift Travel	34"	34"
Ground Clearance(Transport)	17"	17"
Disc Gang Bearings12	12	16
Independent Hydraulic Disc Adjustment	Std	Std
Shank Options	Parabolic or maximum residue retention	Parabolic or Maximum residue retention
Point Options	2-1/2" Straight point,8" wing point	2-1/2" Straight point,8" wing point
Disc Angle Adjustment	3 Degree-18 Degree	3 Degree-18 Degree
Disc Lift Travel	10-3/4"	10-3/4"
Disc Gang Tube	5" x 5"	5" x 5"
V-Ripper Frame Cross Section	8" x 14-1/2"	8" x 14-1/2"
Disc Blade Spacing	7-1/2"	7-1/2"
Tires	14 x 16.1 12 ply	14 x 16.1 12 ply
Approx. Weight	12,328 lbs	14,526 lbs
	2200F	2500
Overall Length	28'	28"
Transport width	17'-6"	15'-16"
Height(Transport)	11'-11"	12'-8"
Disc Working Width(18 degree)	21-5"	23"-11"
Disc Working Width(3 degree)	22'	8'
Lift Travel	34"	34"
Ground Clearance(Transport)	17"	17"
Disc Gang Bearing (Double Row Tapered Roller)	16	18
Independent Hydraulic Disc Adjustment	Std	Std
Number of Shanks	-	-
24" Spacing	9	11
30" Spacing	7	9
Maximum Shank Depth	16"	16"
Shank Options	Parabolic or Maximum Residue Retention	Parabolic or Maximum Residue Retention
Point Options(Parabolic Shanks)	2-1/2" Straight point,8" wing point	2-1/2" Straight point,8" wing point
Disc Angle Adjustment	3 Degree-18 Degree	3 Degree-18 Degree
Disc Lift Travel	10-7/8"	10-7/8"
Disc Gang Tube	5" x 5" Square Tubing	5" x 5" Square Tubing
V-Ripper Frame Cross Section	8" x 14-1/2"	8" x 14-1/2"
Disc Blade Spacing	7-1/2" Effective (15" on Gange)	7-1/2" Effective 15" on Gange
Tires	14 x 16.1 12 ply	14 x 16.1 12 ply
Approx. Weight	16,410 lbs	18,100 lbs

OPERATION

OPERATION

2. OPERATOR REQUIREMENTS

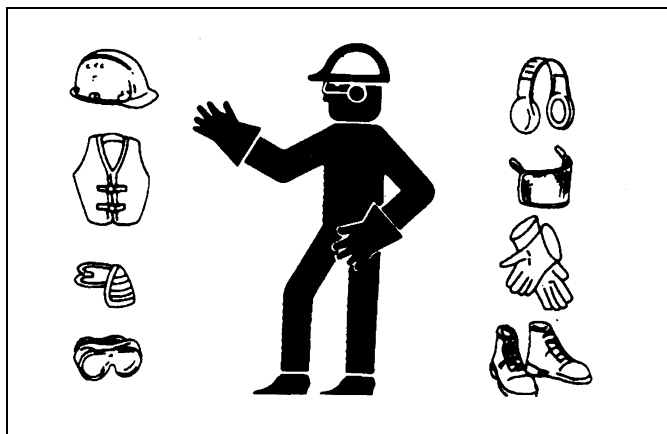
Safe operation of the unit is the responsibility of a qualified operator. A qualified operator has read and understands the implement and tractor Operator's Manuals and is experienced in implement and tractor operation and all associated safety practices. In addition to the safety messages contained in this manual, safety signs are affixed to the implement and tractor. If any part of the operation and safe use of this equipment is not completely understood, consult an authorized dealer for a complete explanation.

If the operator cannot read the manuals for themselves or does not completely understand the operation of the equipment, it is the responsibility of the supervisor to read and explain the manuals, safety practices, and operating instructions to the operator.

Safe operation of equipment requires that the operator wear approved Personal Protective Equipment (PPE) for the job conditions when attaching, operating, servicing, and repairing the equipment. PPE is designed to provide operator protection and includes the following safety wear:

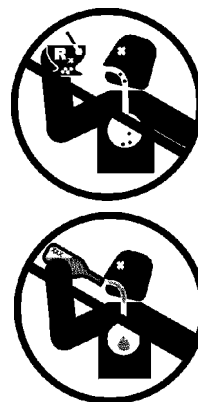
PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Protective Eye Glasses, Goggles, or Face Shield
- Hard Hat
- Steel Toe Safety Footwear
- Gloves
- Hearing Protection
- Close Fitting Clothing
- Respirator or Filter Mask (depends on operating conditions) OPS-U- 0002



⚠ DANGER

NEVER use drugs or alcohol immediately before or while operating the Tractor and Implement. Drugs and alcohol will affect an operator's alertness and coordination and therefore affect the operator's ability to operate the equipment safely. Before operating the Tractor or Implement, an operator on prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to operate the Equipment safely. NEVER knowingly allow anyone to operate this equipment when their alertness or coordination is impaired. Serious injury or death to the operator or others could result if the operator is under the influence of drugs or alcohol. (SG-27)



OPERATION

3. TRACTOR REQUIREMENTS

The tractor used to operate the implement must have the power capacity to lift, pull, and operate the Power Take Off (PTO) at the implement's rated speed while traveling at a ground speed between 4-1/2 to 6 MPH. Operating the implement with a tractor that does not meet the following requirements may cause tractor or implement damage and be a potential danger to the operator and passersby.

Tractor Requirements and Capabilities

- ASAE approved Roll-Over Protective Structure (ROPS) or ROPS cab and seat belt.
- Tractor Safety Devices Slow Moving Vehicle (SMV) emblem, lighting, PTO master shield
- Tractor Horsepower- Minimum 30-50 hp per shank
- Pull Type - Drawbar 14" length-measured from end of PTO shaft to hitch pin hole, rated to carry implement tongue weight, safety chain attachment point
- Front End Weight As needed to maintain 20% weight on front axle
- Power Take Off 540 RPM 6-spline or 1000 RPM 21-spline, 1-3/8" diameter output shaft

3.1 ROPS and Seat Belt

The tractor must be equipped with a Roll-Over-Protective-Structure (ROPS) (tractor cab or roll-bar) and seat belt to protect the operator from falling off the tractor, especially during a roll over where the driver could be crushed and killed. Only operate the tractor with the ROPS in the raised position and seat belt fastened. Tractor model not equipped with a ROPS and seat belt should have these life saving features installed by an authorized dealer. OPS-U- 0003



Operate this Equipment only with a Tractor equipped with an approved roll-over-protective system (ROPS). Always wear seat belts. Serious injury or even death could result from falling off the tractor--particularly during a turnover when the operator could be pinned under the ROPS. (SG-7)



3.2 Tractor Safety Devices

If transporting or operating the tractor and implement near a public roadway, the tractor must be equipped with proper warning lighting and a Slow Moving Vehicle (SMV) emblem which are clearly visible from the rear of the unit. Lights and a SMV emblem must be equipped directly on implements if the visibility of the tractor warning signals are obscured.

Maintain all manufacturer equipped safety shields and guards. Always replace shields and guards that were removed for access to connect, service, or repair the tractor or implement. Never operate the tractor PTO with the PTO master shield missing or in the raised position. OPS-U- 0004

OPERATION

4. Tractor Horsepower

The power required to operate an implement is determined by the tractor PTO horsepower. For most operating conditions, implement requires a tractor with at least 25-35 HP per shank. Operating the implement with a tractor that does not have adequate power may damage the tractor engine. Exceeding required HP may cause implement damage by overpowering the unit in heavy cutting conditions.

4.1 Front End Weight

A minimum of 20% total tractor weight must be maintained on the tractor front end at all times. Front end weight is critical to maintain steering control and to prevent the tractor from rearing up while driving. If the front end is too light, add weight until a minimum of 20% total weight is reached on the front tires. Front weights and weight carriers can be purchased through an authorized tractor dealership. OPS-U- 0005

4.2 Tractor Hydraulics

The 1700 and 2200 Earthmaster requires two hydraulic remotes for the base unit and one additional remote for the optional Coil Tine Leveler. The 2200F and 2500 Earthmaster requires 3 hydraulic remotes for the base unit. The tractor hydraulic system will need to be able to produce at least 1800PSI of pressure.

5. GETTING ON AND OFF THE TRACTOR

Before getting onto the tractor, the operator must read and completely understand the implement and tractor operator manuals. If any part of either manual is not completely understood, consult an authorized dealer for a complete explanation. OPS-U- 0007



WARNING

Do not mount or dismount the Tractor while the tractor is moving. Mount the Tractor only when the Tractor and all moving parts are completely stopped. (SG-12)



5.1 Boarding the Tractor

Use both hands and equipped handrails and steps for support when boarding the tractor. Never use control levers for support when mounting the tractor. Seat yourself in the operator's seat and secure the seat belt around you.

Never allow passengers to ride on the tractor or attached equipment. Riders can easily fall off and be seriously injured or killed from falling off and being ran over. It is the operator's responsibility to forbid all extra riders at all times. OPS-U- 0008



DANGER

Never allow children to operate, ride on, or come close to the Tractor or Implement. Usually, 16-17 year-old children who are mature and responsible can operate the implement with adult supervision, if they have read and understand the Operator's Manuals, been trained in proper operation of the tractor and Implement, and are physically large enough to reach and operate the controls easily. (SG-11)



OPERATION



Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in serious injury or death. (SG-10)



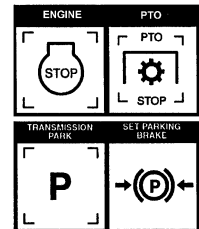
5.2 Dismounting the Tractor

Before dismounting, park the tractor and implement on a reasonably level surface, apply the parking brake, idle the engine down, disengage the PTO, and lower the implement to the ground. Shut down the tractor engine according to the operator's manual, remove the key, and wait for all motion to completely stop. Never leave the seat until the tractor, its engine and all moving parts have come to a complete stop.

Use hand rails and steps when exiting the tractor. Be careful of your step and use extra caution when mud, ice, snow or other matter has accumulated on the steps or hand rails. Use all handrails and steps for support and never rush or jump off the tractor. OPS-U- 0009



BEFORE leaving the tractor seat, always engage the brake and/or set the tractor transmission in parking gear, disengage the PTO, stop the engine, remove the key, and wait for all moving parts to stop. Place the tractor shift lever into a low range or parking gear to prevent the tractor from rolling. Never dismount a Tractor that is moving or while the engine is running. Operate the Tractor controls from the tractor seat only. (SG-9)



OPERATION

OPERATION

6. STARTING THE TRACTOR

The operator must have a complete understanding of the placement, function, and operational use of all tractor controls before starting the tractor. Review the tractor operator's manual and consult an authorized dealer for tractor operation instructions if needed.

Essential Tractor Controls:

- Locate the light control lever.
- Locate the engine shut off control.
- Locate the brake pedals and the clutch.
- Locate the PTO control.
- Locate the 3-point hitch control lever.
- Locate the hydraulic remote control levers.

Before starting the tractor ensure the following:

- Conduct all pre-start operation inspection and service according to the tractor operator's manual.
- Make sure all guards, shields, and other safety devices are securely in place.
- The parking brake is on.
- The PTO control lever is disengaged.
- The 3-point hitch control lever is in the lowered position.
- The hydraulic remote control levers are in the neutral position.
- The tractor transmission levers are in park or neutral.

Refer to the tractor owner's manual for tractor starting procedures. Only start the tractor while seated and belted in the tractor operator's seat. Never bypass the ignition switch by short circuiting the starter solenoid.

After the tractor engine is running, avoid accidental contact with the tractor transmission to prevent sudden and unexpected tractor movement. *OPS-U-0028*



Never run the Tractor engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health. (SG-23)



Start tractor only when properly seated in the Tractor seat. Starting a tractor in gear can result in injury or death. Read the Tractor operators manual for proper starting instructions. (SG-13)



7. CONNECTING THE IMPLEMENT TO THE TRACTOR

Use extreme caution when connecting the Implement to the tractor. The implement should be securely resting at ground level or setting on blocks. Keep hands and feet from under the implement deck and clear of pinch points between the tractor hitch arms and implement pins. *OPS-T-0001*

OPERATION



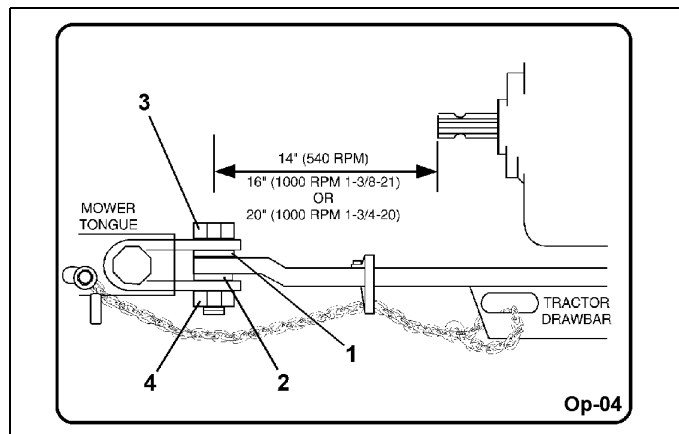
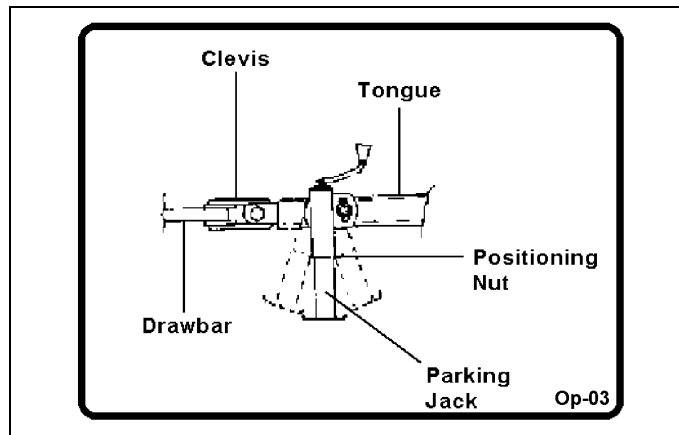
Always shut the Tractor completely down, place the transmission in park, and set the parking brake before you or anyone else attempts to connect or disconnect the Implement and Tractor hitches. (S3PT-15)

7.1 Connecting the Implement

1. Make sure the tractor is equipped with the correct drawbar.
2. Block the unit wheels in place and use the attached parking jack to raise or lower the tongue clevis to the height of the tractor drawbar. The parking jack can be rotated 15 degrees in each direction to obtain a near vertical position.

Note: Always place jack foot on firm surface or place board under jack for support.

3. Board the tractor and start the engine. Back the tractor to the unit aligning the drawbar hitch hole with the unit hitch clevis. Turn off the tractor engine, set the parking brake, place the tractor in park, and dismount.
4. Securely attach unit safety chain to tractor drawbar or drawbar support frame.
5. Lower the jack until the tongue is completely supported by the drawbar. Remove jack from the tongue and place on storage bracket of unit main frame.
6. Finally, attach the hydraulic hoses.



OPERATION

Safety Chains

When towing implements on a public roadway, use a safety chain with tensile strength equal to or greater than the gross weight of the unit being towed. This will control the implement in the event the hitch pin is lost during transport.

After the ends of the safety chain are attached to the implement and the tractor, make a trial run by driving the tractor to the right and to the left to check for proper length. If necessary, readjust the chain to eliminate loose or tight chain lengths.

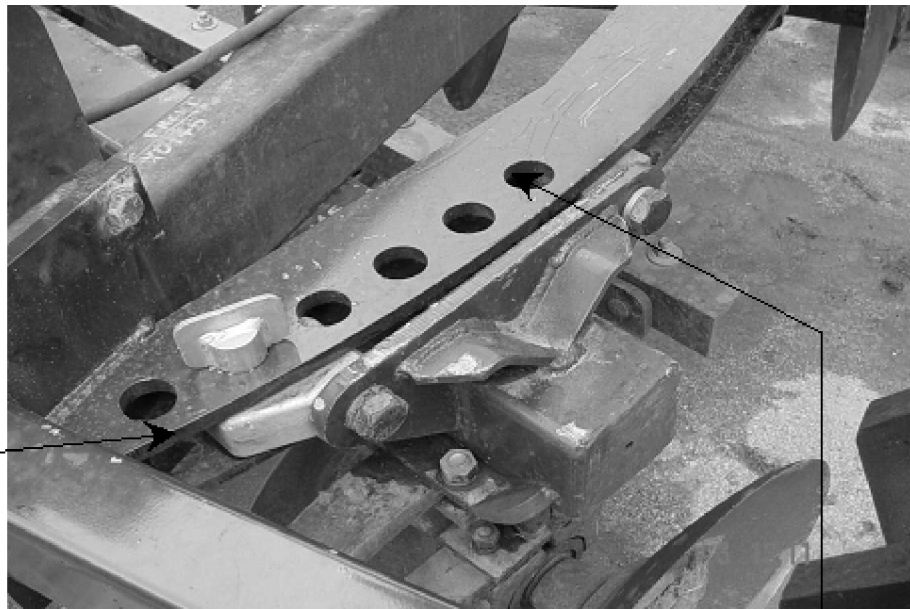
OPERATION

8. SETTING THE IMPLEMENT

8.1 Setting the Tillage Equipment

1. Disc Gang Angle

- a. The Disc Gang angle can be varied from 3° to 18° in 3° increments. The lower settings will leave larger amounts of residue on the surface while the higher settings will bury and mix more soil with the residue.
- b. To make adjustments: (1) Remove the lynch pin from the disc angle pin and remove the pin. (2) Slide the disc gang tube forward or rearward until the Slide block aligns with the correct hole. Sliding the front and rear gang tube away from each other increases the angle aggressiveness of the disc gangs.



18° Most
Aggressive

3° Least
Aggressive

Ops-1219

OPERATION

2. Shank Depth

- a. The shanks are designed to operate at 8-16 " deep. See diagram for depth settings. Please note that the settings are approximate depending on your field conditions. Be sure to verify the shank depth in the field with some measuring device.
- b. To make adjustments
 - (1) Make sure the unit is fully raised and all transport locks are properly installed.
 - (2) Remove the depth setting pin from both sides of the mainframe and reinstall them in the desired hole referencing the depth setting decal on each side of the mainframe to ensure that the pins are in the same setting on both sides of the machine.

A	8"
B	9"
C	10"
D	11"
E	12"
F	13"
G	14"
H	15"
I	16"

* Theoretical Depth. Soil conditions will affect this setting. Verify ripper depth in field.

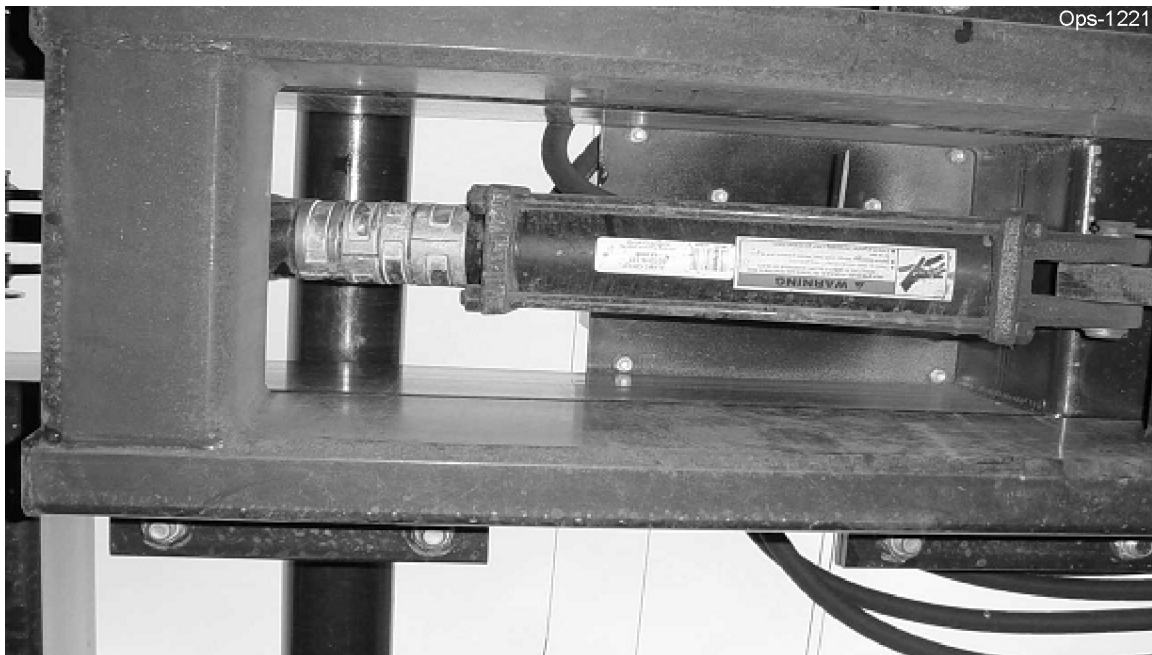
Ops-1220

OPERATION

OPERATION

3. Disc Depth

- c. The Disc depth is hydraulically controlled. Stops can be placed on the disc lift cylinder to limit the disc depth setting. Generally speaking the deeper the disc the less residue will be retained on the field surface. In addition, deeper disc depths will require greater horsepower from your tractor.
- d. To make adjustments
 - (1) While operating in the field, observe the disc operating depth and using the correct hydraulic remote make adjustments to the disc depth to achieve the desired result.
 - (2) When properly set, raise the entire unit from the ground using the main lift cylinders and bring the unit to a stop.
 - (3) Make sure all transport locks are properly installed, the tractor engine is shut down and the parking brake is engaged.
 - (4) Place cylinder stops on the disc lift cylinder so that the proper disc depth can be maintained and returned to, if the discs are raised during operation.



OPERATION

4. Mainframe Level

- a. The Front and rear mainframe should be level front to rear when operating in the field.
- b. To make adjustments
 1. Observe the unit while operating in the field, noting the levelness (front to rear) of the entire unit.
 2. Use the turnbuckle on the rear of the tongue to raise or lower the front of the machine. Lowering the entire unit to the ground can help take the load off the turnbuckle for easier adjustments. NOTE:
 - a. Extending the turnbuckle will Lower the front of the Earthmaster
 - b. Retracting the turnbuckle will raise the front of the Earthmaster

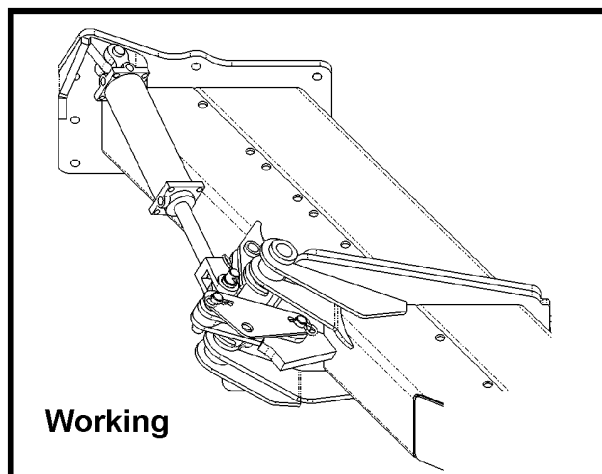
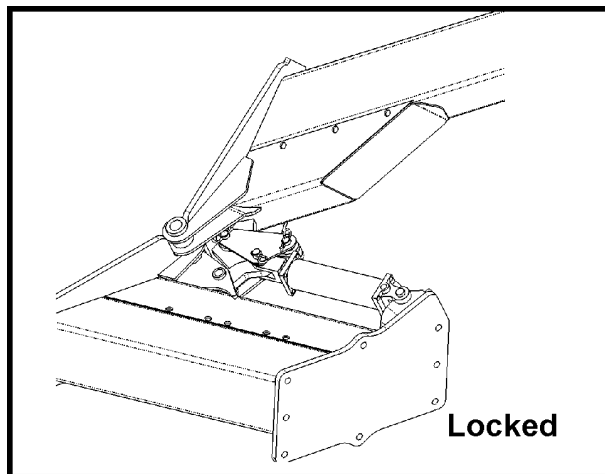


OPERATION

OPERATION

5. Transport Locks

- a. Always install the Transport Cylinder stops on the Earthmaster before transporting the Earthmaster on the road.



Ops-1223

6. Hydraulics/ Sequence Valve

- a. The sequence valve comes factory set to activate at 1800 PSI.
- b. When hydraulic pressure is applied to the main lift circuit the main lift cylinders on the axle will begin to lift the unit. When the Main lift cylinders reach full extension, the sequence valve diverts the hydraulic flow to the tongue cylinder to level the unit.
- c. When hydraulic pressure is reversed, the tongue cylinder will retract lowering the front of the Earthmaster. When the tongue cylinder is fully retracted the sequence valve diverts the hydraulic flow back to the main lift cylinders allowing them to lower the unit into the ground.
- d. NOTE: The raising and lowering of the unit can be reversed at any time during thesequence without causing problems.

9. PRE-OPERATION INSPECTION AND SERVICE

Before each use, a pre-operation inspection and service of the implement and tractor must be performed. This includes routine maintenance and scheduled lubrication, inspecting that all safety devices are equipped and functional, and performing needed repairs. DO NOT operate the unit if the pre-operation inspection reveals any condition affecting safe operation. Perform repairs and replacement of damaged and missing parts as soon as noticed. By performing a thorough pre-operation inspection and service, valuable down time and repair cost can be avoided. OPS-U-0029

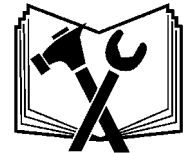
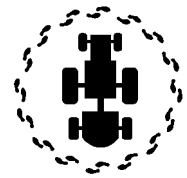


Always disconnect the main PTO Driveline from the Tractor before performing service on the Implement. Never work on the Implement with the tractor PTO driveline connected and running. Rotating Parts, Blades or Drivelines could turn without warning and cause immediate entanglement, injury or death. (S3PT-11)

OPERATION



Periodically inspect all moving parts for wear and replace when necessary with authorized service parts. Look for loose fasteners, worn or broken parts, and leaky or loose fittings. Make sure all pins have cotter pins and washers. Serious injury may occur from not maintaining this machine in good working order. (SG-21)



OPERATION

9.1 Tractor Pre-Operation Inspection/Service

Refer to the tractor operator's manual to ensure a complete pre-operation inspection and scheduled service is performed according to the manufacturers recommendations. The following are some of the items that require daily service and inspection:

- Tire condition/air pressure
- Wheel lug bolts
- Steering linkage
- PTO shield
- SMV sign is clean and visible
- Tractor's lights are clean and functional
- Tractor Seat belt is in good condition
- Tractor ROPS is in good condition
- ROPS is in the raised position
- No tractor oil leaks
- Radiator free of debris
- Engine oil level and condition
- Engine coolant level and condition
- Power brake fluid level
- Power steering fluid level
- Fuel condition and level
- Sufficient lubrication at all lube points
- Air filter condition OPS-U-0030



9.2 Implement Pre-Operation Inspection/Service

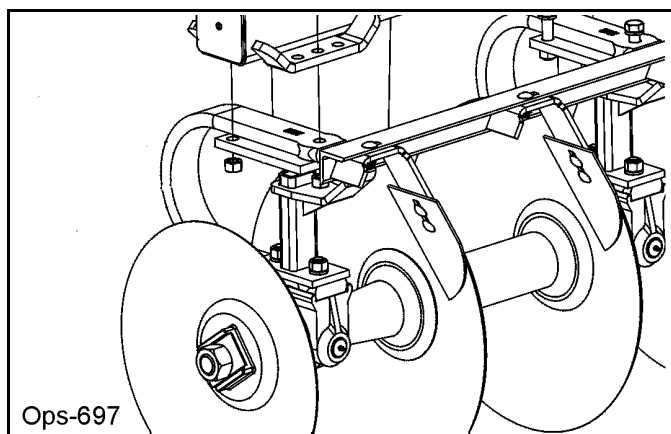
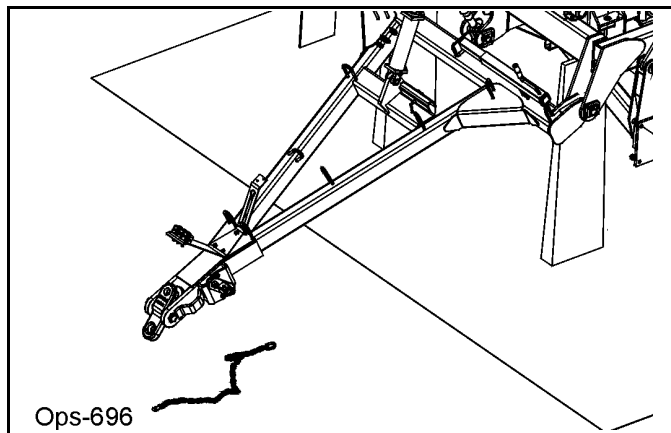
Before each implement use, a complete inspection and service is required to ensure the implement is in a good and safe working condition. Damaged and/or broken parts should be repaired and/or replaced immediately. To ensure the implement is ready for operation, conduct the following. OPS-T-0002

OPERATION

OPERATION

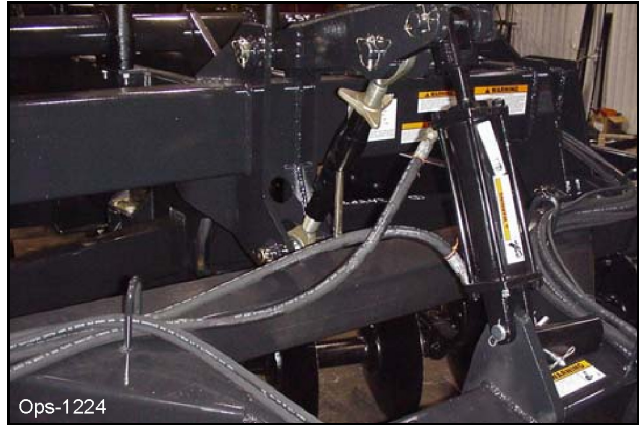
The operator's manual and safety signs affixed on the unit contain important instructions on the safe and proper use of the equipment. Maintain these important safety features on the implement in good condition to ensure the information is available to the operator at all times.

- Ensure the manual canister is secured to the equipment with the operator's manual inside.
- Ensure all safety signs are in place and legible. Replace missing, damaged, and illegible decals. *OPS-U- 0011*
- Perform scheduled lubrication as detailed in the maintenance section.
- Ensure all decals are in place and legible.
- Ensure that a properly rated safety tow chain is equipped securing the implement to the tractor. *OPS-T-0016*
- Before operation check disc blades and spools for breakage or cracking and replace if needed.
- Inspect Disc Gang and grease after every 8 hour use.
- Check and Re-Adjust Disc Scrapers when conditions change.
- Inspect all bolts and screws and tighten to therecommended torque. *OPS-T-0017*



OPERATION

- Ensure each hydraulic cylinders are installed and retained correctly. Ensure the proper size pins are used to retain the cylinders in place and are secured with pins.
- Check for hydraulic oil leaks on the cylinders, along the hydraulic lines, and at tractor hydraulic ports. **IMPORTANT: DO NOT** use your hands to check for oil leaks. Use a piece of heavy paper or cardboard to check for hydraulic oil leaks. OPS-T-0024

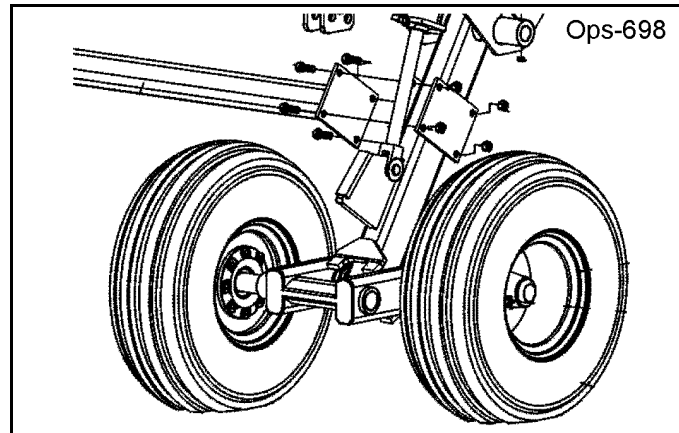


WARNING

Do not operate this Equipment with hydraulic oil or fuel leaking. Oil and fuel are explosive and their presence could present a hazard. Do not check for leaks with your hand! High-pressure oil streams from breaks in the line could penetrate the skin and cause tissue damage including gangrene. To check for a hose leak, SHUT the unit ENGINE OFF and remove all hydraulic pressure. Wear oil impenetrable gloves, safety glasses and use Cardboard to check for evidence of oil leaks. If you suspect a leak, REMOVE the HOSE and have it tested at a Dealer. If oil does penetrate the skin, have the injury treated immediately by a physician knowledgeable and skilled in this procedure. (SG-15)



- Inspect tire condition, wheel bearings, and lug nut torque.
- Inspect all bolts and screws and tighten to the recommended torque. OPS-T-0018



OPERATION

Tractor PRE-OPERATION Inspection



Mower ID# _____

Make _____

Date: _____

Shift _____



WARNING

Before conducting the inspection, make sure the tractor engine is off, all rotation has stopped and the tractor is in park with the parking brake engaged. Make sure the mower is resting on the ground or securely blocked up and all hydraulic pressure has been relieved.

Item	Condition at Start of Shift	Specific Comments if not O.K.
The flashing lights function properly		
The SMV Sign is clean and visible		
The tires are in good condition with proper pressure		
The wheel lug bolts are tight		
The tractor brakes are in good condition		
The steering linkage is in good condition		
There are no visible oil leaks		
The hydraulic controls function properly		
The ROPS or ROBS Cab is in good condition		
The seatbelt is in place and in good condition		
The 3-point hitch is in good condition		
The drawbar pins are securely in place		
The PTO master shield is in place		
The engine oil level is full		
The brake fluid level is full		
The power steering fluid level is full		
The fuel level is adequate		
The engine coolant fluid level is full		
The radiator is free of debris		
The air filter is in good condition		

Operator's Signature: _____

DO NOT OPERATE an UNSAFE TRACTOR or MOWER

OPERATION

10. DRIVING THE TRACTOR AND IMPLEMENT

Safe tractor transport requires the operator possess a thorough knowledge of the model being operated and precautions to take while driving with an attached implement. Ensure the tractor has the capacity to handle the weight of the implement and the tractor operating controls are set for safe transport. To ensure safety while driving the tractor with an attached implement, review the following. *OPS-U- 0012*



Never run the Tractor engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health. (SG-23)



Transport only at speeds where you can maintain control of the equipment. Serious accidents and injuries can result from operating this equipment at high speeds. Understand the Tractor and Implement and how it handles before transporting on streets and highways. Make sure the Tractor steering and brakes are in good condition and operate properly.



Before transporting the Tractor and Implement, determine the proper transport speeds for you and the equipment. Make sure you abide by the following rules:

Test the tractor at a slow speed and increase the speed slowly. Apply the Brakes smoothly to determine the stopping characteristics of the Tractor and Implement. As you increase the speed of the Tractor the stopping distance increases. Determine the maximum transport speed not to exceed 20 mph (30 kph) for transporting this equipment.

Test the equipment at a slow speed in turns. Increase the speed through the turn only after you determine that the equipment can be operated at a higher speed. Use extreme care and reduce your speed when turning sharply to prevent the tractor and implement from turning over. Determine the maximum turning speed for you and this equipment before operating on roads or uneven ground.

Only transport the Tractor and Implement at the speeds which allow you to properly control the equipment.

Be aware of the operating conditions. Do not operate the Tractor with weak or faulty brakes or worn tires. When operating down a hill or on wet or rain slick roads, the braking distance increases: use extreme care and reduce your speed. When operating in traffic always use the Tractor's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy. (SG-19)



OPERATION

OPERATION

10.1 Starting the Tractor

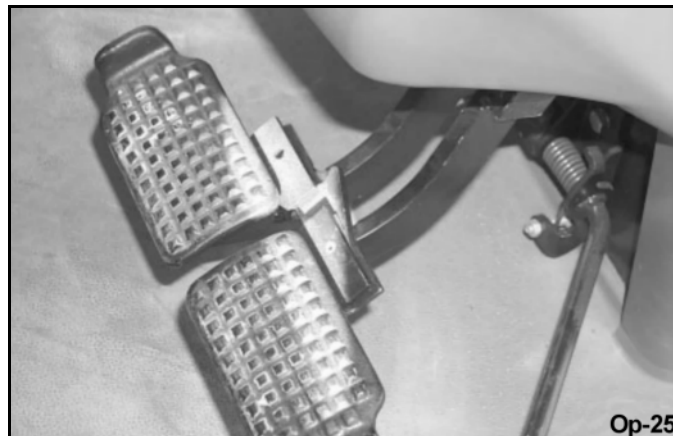
The procedure to start the tractor is model specific. Refer to the tractor operator's manual for starting procedures for your particular tractor. Consult an authorized dealer if the starting procedure is unclear. Ensure the 3-point control lever is in the lowered position and the PTO is disengaged before starting the tractor. OPS-U-0033



10.2 Brake and Differential Lock Setting

Make sure the tractor brakes are in good operating condition. Tractor brakes can be set to operate independently allowing single rear wheel braking action or locked together to provide simultaneous rear wheel braking. FOR MOST DRIVING AND OPERATING CONDITIONS, THE BRAKE PEDALS SHOULD BE LOCKED TOGETHER TO PROVIDE THE MOST EFFECTIVE BRAKING ACTION.

Always disengage the tractor differential lock when turning. When engaged the differential lock will prevent or limit the tractor from turning. During normal cutting conditions, locking the differential provides no benefit and should not be used. OPS-U- 0013



⚠ WARNING

Be aware of the operating conditions. Do not operate the Tractor with weak or faulty brakes. When operating down a hill or on wet or rain slick roads, the braking distance increases; use extreme care and reduce your speed in these conditions. When operating in traffic, always use the Tractor's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy.

10.3 Raising the Unit

When hydraulic pressure is applied to the main lift circuit the main lift cylinders on the axle will begin to lift the unit. When the Main lift cylinders reach full extension, the sequence valve diverts the hydraulic flow to the tongue cylinder to level the unit.

When hydraulic pressure is reversed, the tongue cylinder will retract lowering the front of the Earthmaster. When the tongue cylinder is fully retracted the sequence valve diverts the hydraulic flow back to the main lift cylinders allowing them to lower the unit into the ground.

NOTE: The raising and lowering of the unit can be reversed at any time during the sequence without causing problems.

OPERATION

10.4 Driving the Tractor and Implement

Start off driving at a slow speed and gradually increase your speed while maintaining complete control of the tractor and unit. Moving slowly at first will also prevent the tractor from rearing up and loss of steering control. The tractor should never be operated at speeds that cannot be safely handled or which will prevent the operator from stopping quickly during an emergency. If the power steering or engine ceases operating, stop the tractor immediately as the tractor will be difficult to control. If the tractor becomes stuck or the tires are frozen to the ground, reverse the tractor out to prevent overturning.

Perform turns with the tractor and unit at slow speeds to determine how the tractor with the unit handles a turn. Determine the safe operating speed to maintain proper control of the tractor when making turns. When turning with an attached rear implement, the overall length of the working unit is greatly increased. Allow additional clearance for the implement to swing when turning.

To avoid overturns, drive the tractor with care and at safe speeds, especially when operating over rough ground, crossing ditches or slopes, and turning corners. Tractor wheel tread spacing should be increased when working on inclines or rough ground to reduce the possibility of tipping.

Use extreme caution when operating on steep slopes. Keep the tractor in a low gear when going downhill. DO NOT coast or free-wheel downhill.

11. OPERATING THE TRACTOR AND IMPLEMENT

THE OPERATOR MUST COMPLETELY UNDERSTAND HOW TO OPERATE THE TRACTOR AND IMPLEMENT AND ALL CONTROLS BEFORE ATTEMPTING TO OPERATE. The operator must read and understand the Safety and Operation Sections of the implement and tractor operator's manuals. These manuals must be read and explained to any operator who cannot read. Never allow someone to operate the implement and tractor without complete operating instructions.

Before starting any operation, the operator must become familiar with the area to be worked in and any obstacles and hazards contained within to ensure safety to the operator, bystanders, and equipment. Special attention should be paid to foreign debris, rough terrain, steep slopes, and passersby and animals in the area.
OPS-U- 0015



Many varied objects, such as wire, cable, rope, or chains, can become entangled in the rotating parts of the Implement. These objects could then swing outside the housing at greater velocities than the blades. Such a situation is extremely hazardous and could result in serious injury or even death. Inspect the area for such objects before working in the area. Remove any such objects from the site. Never allow the implement to contact such objects. (STL-6)



Extreme care should be taken when operating near loose objects such as gravel, rocks, wire, and other debris. Inspect the area before mowing. Foreign objects should be removed from the site to prevent machine damage and/or bodily injury or even death. Any objects that cannot be removed must be clearly marked and carefully avoided by the operator. Stop mowing immediately if blades strike a foreign object. Repair all damage and make certain rotor or blade carrier is balanced before resuming mowing. (SGM-05)



OPERATION

OPERATION

11.1 Foreign Debris Hazards

Before operating, inspect the area to make sure there are no foreign objects that the implement knives could hit or become entangled with. Remove all foreign objects and debris. If objects are too big to remove, mark them clearly and be sure to prevent the implement blades from contacting them.

If you hit a solid object or foreign debris, stop the implement and tractor at once. Immediately idle the engine speed and disengage the PTO. Wait for all implement rotating motion to stop, then raise the implement and move the tractor and implement off the object. Inspect the area and remove, or mark the location of the debris. Inspect the condition of the implement and make any needed repairs immediately. Make sure the knives are not damaged and the carrier is balanced before resuming operation.

Always wear your seat belt securely fastened and only operate the tractor and implement with the ROPS in the raised position. If the tractor or implement hits a tree stump, rock, or bump, a sudden movement could throw you off of the seat and under the tractor and/or implement. The seat belt is your best protection from falling off the tractor and the ROPS provides protection from being crushed during a tractor roll-over.
OPS-T-0003



⚠ WARNING

Mow at the speed that you can safely operate and control the tractor and mower. The correct mowing speed depends on terrain condition and grass type, density, and height of cut. Normal ground speed range is from 2 to 5 mph(3-8 kph). Use slow mowing speeds when operating on or near steep slopes, ditches, drop-offs, overhead obstructions, power lines, or when debris and foreign objects are to be avoided. (SGM-07)

⚠ WARNING

Do not exceed the rated PTO speed for the Implement. Excessive PTO speeds can cause Implement driveline or blade failures resulting in serious injury or death. (SG-26)

OPERATION

11.2 Operating the Implement

Only operate the implement from the tractor operator's seat with the seatbelt securely fastened. The tractor must be equipped with a ROPS in the raised position or a ROPS cab.

The implement is designed for horticultural, agricultural, or commercial applications cultivation. Maintained knives will produce a better cultivation and require less power. Travel at a speed that allows the implement sufficient time to cultivate the ground and maintain the PTO operating speed to prevent overloading the implement and tractor. Choose a driving pattern that provides the maximum pass length and minimizes turning.

Avoid operating in the reverse direction when possible. In situations where the implement must be backed to access areas, make sure there are no persons or other foreign debris behind the implement before operating in reverse. When operating in reverse, operate the tractor and implement at a reduced ground speed to ensure tractor and implement control is maintained. OPS-T-0005

11.3 Operating the Implement

When ready for field use, stop the Earthmaster and set the disc angle to desired angle from 3° to 18 ° in 3° increments. The lower setting will leave larger amounts of residue on the surface while the higher settings will bury and mix more soil with the residue.

Next set the depth of the shanks. The shanks are designed to operate at 8-16 " deep. Please note that the settings are approximate depending on your field conditions. Be sure to verify the shank depth in the field with some measuring device.

Then set the disc depth. The Disc depth is hydraulically controlled. Stops can be placed on the disc lift cylinder to limit the disc depth setting. Generally speaking the deeper the disc the less residue will be retained on the field surface. In addition, deeper disc depths will require greater horsepower from your tractor.

Finally level the main frame. Observe the unit while operating in the field, noting the levelness (front to rear) of the entire unit. Use the turnbuckle on the rear of the tongue to raise or lower the front of the machine. Lowering the entire unit to the ground can help take the load off the turnbuckle for easier adjustments. *NOTE:* Extending the turnbuckle will Lower the front of the Earthmaster. Retracting the turnbuckle will raise the front of the Earthmaster.

The tractor must be equipped with a ROPS in the raised position or a ROPS cab.

Stay alert and watch for trees, low hanging limbs, power lines, and other overhead obstacles and solid ground objects while you are operating. Use care to avoid hitting these items.



Avoid mowing in reverse direction when possible. Check to make sure there are no persons behind the mower and use extreme care when mowing in reverse. Mow only at a slow ground speed where you can safely operate and control the tractor and mower. Never mow an area that you have not inspected and removed debris or foreign material.

(SGM-08)

OPERATION

OPERATION



Follow these guidelines to reduce the risk of equipment and grass fires while operating, servicing, and repairing the Mower and Tractor:



- Equip the Tractor with a fire extinguisher in an accessible location.
- Do Not operate the Mower on a Tractor with an underframe exhaust.
- Do Not smoke or have an open flame near the Mower and Tractor.
- Do Not drive into burning debris or freshly burnt areas.
- Ensure slip clutches are properly adjusted to prevent excessive slippage and plate heating.
- Never allow clippings or debris to collect near drivelines, slip clutches, and gearboxes. Periodically shut down the Tractor and Mower and clean clippings and collected debris from the mower deck. (SGM-12)

12. DISCONNECTING THE IMPLEMENT FROM THE TRACTOR

Before disconnecting the implement, the PTO must be disengaged and knife rotation at a complete stop. Move the implement to a level storage location and lower it to the ground. If the implement is not resting securely on the ground, block the implement up securely before attempting to disconnect it from the tractor.

Use extreme care to keep feet and hands from under the implement and clear of any pinch points caused by the tractor hitch arms and implement pins. OPS-T-0008



Never stand or allow another person to stand between a running Tractor and the Implement when disconnecting the Implement from the Tractor. Always shut the Tractor off completely and set the parking brake before attempting to disconnect the Implement pins from the Tractor hitch.



Never unhitch without using the Tongue Jack. The Tongue is very heavy. Attempting to lift the Tongue without using the Tongue Jack could cause strains or other injury. Allowing the tongue to fall suddenly and unexpectedly could result in crushing injury. Use the Tongue Jack for lifting the Implement only. Overloading the Tongue Jack can cause failure with possible serious bodily injury or even death. (STI-04)



Always shut the Tractor completely down, place the transmission in park, and set the parking brake before you or anyone else attempts to connect or disconnect the Implement and Tractor hitches. (S3PT-15)

OPERATION

13. IMPLEMENT STORAGE

Properly preparing and storing the implement at the end of the season is critical to maintaining its appearance and to help ensure years of dependable service. The following are suggested storage procedures:

- Thoroughly clean all debris off the implement to prevent damage from rotting grass and standing water.
- Lubricate all implement grease points and fill gearbox oil levels as detailed in the maintenance section.
- Tighten all bolts and pins to the recommended torque.
- Check the implement for worn and damaged parts. Perform repairs and make replacements immediately so that the implement will be ready for use at the start of the next season.
- Store the implement in a clean, dry place with the implement housing resting securely on blocks or at ground level.
- Keep the driveline yoke from sitting in water, dirt and other contaminants.
- Use spray touch-up enamel where necessary to prevent rust and maintain the appearance of the implement.

It is critical that driveline clutches slip when an obstacle or heavy load is encountered to avoid implement and/or tractor damage. If the implement sits outside for an extended period of time or is exposed to rain and/or humid air, the clutch lining plates must be inspected to ensure they are not frozen together from rust or corrosion. If the implement has been exposed to such conditions, at the start of each operating season, and any time it is suspected that the slip clutch plates may be frozen together, readjust the slip clutch as detailed in Seasonal Clutch Maintenance of the maintenance section in this manual. *OPS-T-0010*



Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in serious injury or death. (SG-10)



Do not use your hands or feet to clean the disc gangs. The discs are sharp and serious injuries could result from inadvertent contact with the discs. Never attempt to stand on the discs, tires, or frame members of the implement. (STL-11)

14. TRANSPORTING THE TRACTOR AND IMPLEMENT

Inherent hazards of operating the tractor and implement and the possibility of accidents are not left behind when you finish working in an area. Therefore, the operator must employ good judgement and safe operation practices when transporting the tractor and implement between locations. By using good judgement and following safe transport procedures, the possibility of accidents while moving between locations can be substantially minimized. *OPS-U-0017*



Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in serious injury or death. (SG-10)

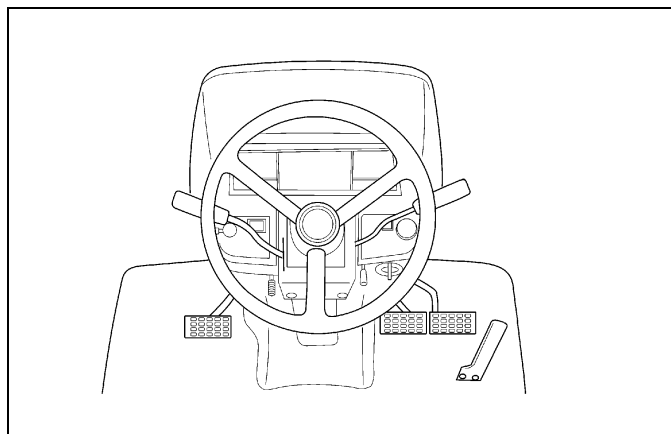


OPERATION

OPERATION

Before transporting the tractor and implement, idle the tractor engine, disengage the PTO and wait for all implement moving parts to come to a complete stop. Once all implement parts are completely stopped, raise the implement to transport height.

NOTE: When raising the implement, maintain 1" clearance between the driveline and implement deck. If additional implement deck height is needed for transport, disconnect the driveline from the tractor and secure its end to the implement deck. The implement can then be raised to the maximum lift height. OPS-T-0011



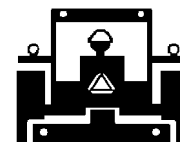
14.1 Transporting on Public Roadways

Extreme caution should be used when transporting the tractor and implement on public roadways. The tractor must be equipped with all required safety warning features including a SMV emblem and flashing warning lights to alert drivers of the tractor's presence. Remember that roadways are primarily designed for automotive drivers and most drivers will not be looking out for you, therefore, you must look out for them. Check your side view mirrors frequently and remember that vehicles will approach quickly because of the tractor's slower speed. Be extremely cautious when the piece of equipment that you are towing is wider than the tractor tire width and/or extends beyond your lane of the road.

Make sure that a proper size safety tow chain is secured between the tractor and implement before entering a public road. OPS-U- 0019



Make certain that the "Slow Moving Vehicle" (SMV) sign is installed in such a way as to be clearly visible and legible. When transporting the Equipment use the Tractor flashing warning lights and follow all local traffic regulations. (SG-6)



The SMV (Slow-Moving Vehicle) emblem is universal symbol used to alert drivers of the presence of equipment traveling on roadways at a slow speed. SMV signs are a triangular bright orange with reflective red trim for both easy day and night visibility. Make sure the SMV sign is clean and visible from the rear of the unit before transporting the tractor and implement on a public roadway. Replace the SMV emblem if faded, damaged, or no longer reflective. OPS-U- 0020



Op-43

OPERATION

Make sure that all tractor flashing warning lights, headlights, and brake/tail lights are functioning properly before proceeding onto public roads. While newer model tractors have plenty of lighting to provide warning signals and operating lighting, most older models are only equipped with operating lights. Consult an authorized tractor dealer for lighting kits and modifications available to upgrade the lighting on older tractor models. *OPS-U- 0021*



When operating on public roads, have consideration for other road users. Pull to the side of the road occasionally to allow all following traffic to pass. Do not exceed the legal speed limit set in your country for agricultural tractors. Always stay alert when transporting the tractor and implement on public roads. Use caution and reduce speed if other vehicles or pedestrians are in the area. *OPS-T-0013*

Reduce speed before turning or applying the brakes. Ensure that both brake pedals are locked together when operating on public roads. *OPS-U- 0023*



OPERATION

OPERATION

14.2 Hauling the Tractor and Implement

Before transporting a loaded tractor and implement, measure the height and width dimensions and gross weight of the complete loaded unit. Ensure that the load will be in compliance with the legal limits set for the areas that will be traveled through. *OPS-U- 0024*



Use adequately sized and rated trailers and equipment to transport the tractor and implement. Consult an authorized dealer to determine the proper equipment required. Using adequately sized chains, heavy duty straps, cables and/or binders, securely tie down both the front and rear of the tractor utilizing the proper tie down locations as specified by the tractor manufacturer. *OPS-U- 0025*



Arrange the chains so that when tightened, the chains are pulling downward and against themselves. Carefully tighten the securing chains or other fasteners using boomers or binders to apply maximum tension. Use extreme care when attaching and removing the securing devices as the extreme tension involved when released has the potential to inflict serious injury.

While hauling the tractor and implement, make occasional stops to check that the tractor and implement have not moved or shifted and that the securing chains have maintained tension. If during transport a hard braking, sharp turning, or swerving action was performed, stop at the next safe location to inspect the security of the load. *OPS-U- 0026*



MAINTENANCE SECTION

Maintenance Section 5-1

MAINTENANCE

MAINTENANCE

GENERAL MAINTENANCE

1. Grease disc gang bearings daily.
2. Grease cylinder pins every 8 hours.
3. Grease lift wheels strut pivots every 8 hours.
4. Grease automatic reset shanks every 8 hours if Earthmaster is equipped with them.
5. Keep disc gang bolt tight. Torque to 800-850 ft./lbs. Check all bolts for tightness periodically.
6. Keep tire inflated to 45 PSI.
7. Check wheel lug bolts after first 4 hours of use and tighten if necessary. Check periodically.
8. Repack transport wheels, gauge wheels and coulter bearings yearly.




PROPER TORQUE CHART FOR FASTENERS

The chart lists the correct tightening torque for fasteners. When bolts are to be tightened or replaced, refer to this chart to determine the grade of bolts and the proper torque except when specific torque values are assigned in manual text.





RECOMMENDED TORQUE IN FOOT POUNDS UNLESS OTHERWISE STATED IN THE MANUAL *

NOTE: These values apply to fasteners as received from supplier, dry or when lubricated with normal engine oil. They do not apply if special graphited or molydisulphide greases or other extreme pressure lubricants are used. This applies to both UNF fine and UNC coarse threads.

Proper Torque values for bolts that are measured in Inches

Bolt Diameter	 Head Marking No Marks Grade Two Pound - Foot Value Dry	 Head Marking Three Lines Grade Five Pound - Foot Value Dry	 Head Marking Six Lines Grade Eight Pound - Foot Value Dry
1/4"	5.5	9	12.5
5/16"	11	18	26
3/8"	20	33	46
7/16"	32	52	75
1/2"	50	80	115
9/16"	70	115	160
5/8"	100	160	225
3/4"	175	280	400
7/8"	175	450	650
1"	270	675	975
1-1/8"	375	850	1350
1-1/4"	530	1200	1950
1-3/8"	700	1550	2550
1-1/2"	930	2100	3350

Proper Torque values for Metric bolts

Bolt Diameter	 Head Marking 4.8 Pound - Foot Value Dry	 Head Marking 8.8 or 9.8 Pound - Foot Value Dry	 Head Marking 10.9 Pound - Foot Value Dry	 Head Marking 12.9 Pound - Foot Value Dry
6mm	4.5	8.5	12	14.5
8mm	11	20	30	35
10mm	21	40	60	70
12mm	37	70	105	120
14mm	60	110	165	190
16mm	92	175	255	300
18mm	125	250	350	410
20mm	180	350	500	580
22mm	250	475	675	800
24mm	310	600	850	1000
27mm	450	875	1250	1500
30mm	625	1200	1700	2000

*To get Newton-Meters multiply pound-foot of torque by 1.356

M & W

LIMITED WARRANTY

1. LIMITED WARRANTIES

- 1.01. M & W warrants for one year from the purchase date to the original non-commercial, governmental, or municipal purchaser ("Purchaser") and warrants for six months to the original commercial or industrial purchaser ("Purchaser") that the goods purchased are free from defects in material or workmanship.
- 1.02. Manufacturer will replace for the Purchaser any part or parts found, upon examination at one of its factories, to be defective under normal use and service due to defects in material or workmanship.
- 1.03. This limited warranty does not apply to any part of the goods which has been subjected to improper or abnormal use, negligence, alteration, modification, or accident, damaged due to lack of maintenance or use of wrong fuel, oil, or lubricants, or which has served its normal life. This limited warranty does not apply to any part of any internal combustion engine, or expendable items such as blades, shields, guards, or pneumatic tires except as specifically found in your Operator's Manual.
- 1.04. Except as provided herein, no employee, agent, Dealer, or other person is authorized to give any warranties of any nature on behalf of Manufacturer.

2. REMEDIES AND PROCEDURES.

- 2.01. This limited warranty is not effective unless the Purchaser returns the Registration and Warranty Form to Manufacturer within 30 days of purchase.
- 2.02. Purchaser claims must be made in writing to the Authorized Dealer ("Dealer") from whom Purchaser purchased the goods or an approved Authorized Dealer ("Dealer") within 30 days after Purchaser learns of the facts on which the claim is based.
- 2.03. Purchaser is responsible for returning the goods in question to the Dealer.
- 2.04. If after examining the goods and/or parts in question, Manufacturer finds them to be defective under normal use and service due to defects in material or workmanship, Manufacturer will:
 - (a) Repair or replace the defective goods or part(s) or
 - (b) Reimburse Purchaser for the cost of the part(s) and reasonable labor charges (as determined by Manufacturer) if Purchaser paid for the repair and/or replacement prior to the final determination of applicability of the warranty by Manufacturer.

The choice of remedy shall belong to Manufacturer.

- 2.05. Purchaser is responsible for any labor charges exceeding a reasonable amount as determined by Manufacturer and for returning the goods to the Dealer, whether or not the claim is approved. Purchaser is responsible for the transportation cost for the goods or part(s) from the Dealer to the designated factory.

3. LIMITATION OF LIABILITY.

- 3.01. MANUFACTURER DISCLAIMS ANY EXPRESS (EXCEPT AS SET FORTH HEREIN) AND IMPLIED WARRANTIES WITH RESPECT TO THE GOODS INCLUDING, BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
- 3.02. MANUFACTURER MAKES NO WARRANTY AS TO THE DESIGN, CAPABILITY, CAPACITY, OR SUITABILITY FOR USE OF THE GOODS.
- 3.03. EXCEPT AS PROVIDED HEREIN, MANUFACTURER SHALL HAVE NO LIABILITY OR RESPONSIBILITY TO PURCHASER OR ANY OTHER PERSON OR ENTITY WITH RESPECT TO ANY LIABILITY, LOSS, OR DAMAGE CAUSED OR ALLEGED TO BE CAUSED DIRECTLY OR INDIRECTLY BY THE GOODS INCLUDING, BUT NOT LIMITED TO, ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES RESULTING FROM THE USE OR OPERATION OF THE GOODS OR ANY BREACH OF THIS WARRANTY. NOTWITHSTANDING THE ABOVE LIMITATIONS AND WARRANTIES, MANUFACTURER'S LIABILITY HEREUNDER FOR DAMAGES INCURRED BY PURCHASER OR OTHERS SHALL NOT EXCEED THE PRICE OF THE GOODS.
- 3.04. NO ACTION ARISING OUT OF ANY CLAIMED BREACH OF THIS WARRANTY OR TRANSACTIONS UNDER THIS WARRANTY MAY BE BROUGHT MORE THAN TWO (2) YEARS AFTER THE CAUSE OF ACTION HAS OCCURRED.

4. MISCELLANEOUS.

- 4.01. Proper Venue for any lawsuits arising from or related to this limited warranty shall be only in Guadalupe County, Texas.
- 4.02. Manufacturer may waive compliance with any of the terms of this limited warranty, but no waiver of any terms shall be deemed to be a waiver of any other term.
- 4.03. If any provision of this limited warranty shall violate any applicable law and is held to be unenforceable, then the invalidity of such provision shall not invalidate any other provisions herein.
- 4.04. Applicable law may provide rights and benefits to purchaser in addition to those provided herein.

KEEP FOR YOUR RECORDS

ATTENTION: Purchaser should fill in the blanks below for his reference when buying repair parts and/or for proper machine identification when applying for warranty.

M & W Implement Model _____ Serial Number _____

Date Purchased _____ Dealer _____

ATTENTION:

READ YOUR OPERATOR'S MANUAL

M & W

1020 S Sangamon Ave.
Gibson City, IL 60936
217-784-4261





TO THE OWNER/OPERATOR/DEALER

In addition to the standard Limited Warranty shown on the facing page, M & W also provides:

1.) A FIVE-YEAR (60 months) LIMITED WARRANTY* on **GEARBOX components** provided they have been properly maintained† and have not been subjected to abuse or mis-use except as limited below.

* WARRANTY LIMITATIONS - GEARBOX

A) Warranty is ONE-YEAR (12 MONTHS) for Seals (After one year, seals are considered to be WEARING PARTS and replacement is the users' responsibility.)

B) Users' Gearboxes may be rebuilt by M & W or replaced by new or rebuilt Gearboxes at the option of M & W.

† NOTE - "properly maintained" specifically includes, but is not limited to:

A) Running Gearboxes with the proper amount of the correct lubricant.

B) Adjusting Slip Clutches correctly to provide proper protection for Driveline and Gearbox Components.

To keep your implement running efficiently and safely, read your manual thoroughly and follow these directions and the Safety Messages in this Manual. The Table of Contents clearly identifies each section where you can easily find the information you need.

The OCCUPATIONAL SAFETY AND HEALTH ACT (1928.51 Subpart C) makes these minimum safety requirements of tractor operators:

REQUIRED OF THE OWNER:

1. Provide a Roll-Over-Protective Structure that meets the requirements of this Standard; and
2. Provide Seat belts that meet the requirements of this paragraph of this Standard and SAE J4C; and
3. Ensure that each employee uses such Seat belt while the tractor is moving; and
4. Ensure that each employee tightens the Seat belt sufficiently to confine the employee to the protected area provided by the ROPS

REQUIRED OF THE OPERATOR:

1. Securely fasten seat belt if the tractor has a ROPS.
2. Where possible, avoid operating the tractor near ditches, embankments, and holes.
3. Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces.
4. Stay off slopes too steep for safe operation.
5. Watch where you are going - especially at row ends, on roads, and around trees.
6. Do not permit others to ride.
7. Operate the tractor smoothly - no jerky turns, starts, or stops.
8. Hitch only to the drawbar and hitch points recommended by the tractor manufacturer.
9. When the tractor is stopped, set brakes securely and use park lock, if available.



EARTHMASTER 1700-2500 TILLAGE

EM 1700.2200,2200F,2500-SOM-04/09
Printed U.S.A

P/N 5004WC